Sustainable Development Strategy

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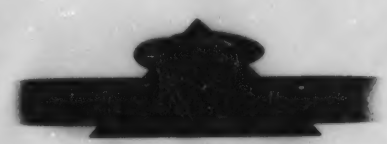

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Minister's Message

Canada in the 21st century must become and remain the world's "smartest" natural resources steward, developer, user and exporter — the most high-tech, the most environmentally friendly, the most socially responsible, the most productive and competitive — leading the world as a living model of sustainable development.

Developing our resources sustainably is crucial to Canada's future. Sustainable development is absolutely essential if the resources sector is to fulfil its role as a major engine of economic growth and job creation in this country, helping to provide the highest standard of living and quality of life to Canadians in the 21st century.

Sustainable development is a constantly-evolving process of identifying and seizing new opportunities to improve the environmental and economic performance of the natural resources sector to maximize social and economic benefits to Canadians.

Natural Resources Canada will capitalize on these opportunities to maintain Canada's status as a global leader in sustainable development so that the resources sector remains a powerhouse of the new economy. We will advance sustainable development through scientific knowledge, technological innovation, stewardship, and building capacity for sustainable communities.

Canadians will continue to show the world that innovation and the integration of technologies make it possible to diminish adverse environmental impacts from resource development and use. This will achieve a cleaner environment for all of us, while creating value-added, globally competitive and ecologically responsible industries that maintain a vibrant economy.

Factoring social, economic and environmental considerations into decision-making, and respecting the needs, values and property interests of all users of the land and its resources is essential to making progress on sustainable development. Equally essential is maintaining the integrity of natural ecosystems and safeguarding our quality of life for Canadians, now and for the future.

We have a shared responsibility to ensure this future comes to fruition so that our children, and their children, will continue to enjoy the extraordinary advantages that make Canadians the envy of the world.

Ralph Goodale

NRCan's Vision of a Sustainable Future

This vision represents Natural Resources Canada's scenario for a future based on sustainable development - a vision that cannot possibly be achieved by a single department, nor by governments alone. It requires ideas, determination and action on behalf of all Canadians, across all sectors of society.

Canada in the 21st century is a society that successfully integrates economic, environmental and social considerations into all resource-related decision making. Canadians make sound decisions about resource development and use – decisions that consider ecological limits; factor in social dynamics that reflect local and global priorities; and capitalize on innovations and technological solutions that overcome environmental challenges to keep Canada competitive in the international marketplace. People of all ages, all regions and all sectors work cooperatively and strategically to minimize the risks and maximize the rewards of responsible natural resources development.

It is a nation that takes full advantage of scientific knowledge and new technologies to harvest and extract resources in ways that maintain the integrity of natural ecosystems and that protect the nation's landmass, water, air and wildlife. Human impacts on biodiversity have been dramatically reduced and mediated.

Canadians have access to an abundance of water of superior quality. Forests are utilized and respected for multiple uses, including recreation, resource extraction as well as the pursuit of Aboriginal people's traditional lifestyle. Healthy communities make optimal use of resources such as water and energy, and manage end-of-life issues in ecologically benign ways. A generation accustomed to recycling and reusing – mining above-ground resources through resource recovery – fails to understand society's previous reliance on landfill sites. Energy efficiency, and renewable and alternative fuels are part of the mainstream.

Communities thrive as a result of technological innovation, economic diversification and increased local decision-making. Up-to-date, leading edge information is broadly available and utilized, creating equitable opportunities for education and poverty alleviation through a technologically skilled workforce capable of capitalizing on job creation.

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The private sector assumes greater responsibility for, and realizes the benefits of, the development of products with a longer life that reduce and manage wastes, and free up landfill space for other uses. Canadian firms market their knowledge and expertise to the world, satisfying global demand for ecologically-responsible products and services. These innovations enable companies to realize productivity gains, contributing to Canada's competitiveness and ongoing economic growth, ensuring Canada maintains its reputation as a global leader in sustainable development.

Beyond the natural resources sector, the focus has shifted to community needs and shared values. Communities are virtually connected, enabling environmentally-friendly patterns of urban and rural land use and activity. Common-place practices including telework and telehealth mean a reduced reliance on the automobile. Canadians who continue to commute rely more on car pooling, cycling or walking as a result of a changed behaviour and outlook.

Natural Resources Canada demonstrates leadership by carrying out the necessary scientific research and making its knowledge widely available to translate sustainable development ideals into common practice. Government sets for itself – and meets – the highest standards that individuals, corporations and communities can be confident are achievable and are motivated to emulate.

Future generations will look back on the turn of the century as a watershed in our nation's history – a time when there was a strong cohesion of views among governments, industry, communities and a well-informed public that led to a joint commitment to action.

To make this vision a reality, Natural Resources Canda has established a set of goals, each of which have multiple objectives and actions that will enable the Department to advance sustainable development through its programs, policies, science and technology, legislation and regulations, and operations.

The actions of this Sustainable Development Strategy are framed within the context of the anticipated outcome that will support this vision of a sustainable future. Progress towards this vision is measured against the Department's objectives, which support Natural Resources Canada's sustainable development goals, both now and for the future. Further, Canada's progress towards this vision will be measured through national indicators of sustainable development – refer to **Measuring the Vision** at the close of this document, on page 76.

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Introduction

Natural Resources Canada (NRCan)'s mandate to responsibly develop and use Canada's resources by integrating economic, environmental and social factors into resource development decision making presents a real challenge. It is also an opportunity to enrich the quality of life of Canadians today and for future generations.

The *Department of Natural Resources Act* states that "in exercising the powers and performing the duties and functions assigned to the Minister ... the Minister shall have regard to the sustainable development of Canada's natural resources and the integrated management thereof."

Natural Resources Canada has articulated a vision of a sustainable future that reflects this mandate – a vision well on its way to realization as we make measurable progress in advancing the Department's sustainable development goals, first articulated in 1997 in *Sustainable Development Strategy: Safeguarding our Assets, Securing our Future*.

The commitments in *Sustainable Development Strategy (SDS) – Now and for the Future* continue to move this agenda towards a future in which the wise use of our natural resources enables us to protect the health of Canadians, the environment and landmass, while continuing to efficiently meet human needs for energy, forest and mineral-based products, both now and for the future.

SDS – Now and for the Future is the result of extensive consultations with Departmental staff, senior managers and stakeholders who were asked to review and respond to *The Path Forward to Sustainable Development Strategy 2000*, a discussion paper that identified the areas where NRCan can make a meaningful difference. The paper reflected the latest thinking on sustainable development priorities as well as the lessons learned since the initial strategy's launch in the late 1990s.

The discussion paper itself was the product of four public input processes – a progress report and questionnaire; Northern Sustainable Development Strategy consultations; meetings with representative stakeholder groups; as well as a Leaders' Forum on Sustainable Development.

Canadians' ideas and suggestions for improvement have been incorporated into the current strategy, which has been strengthened by their enthusiasm and support.

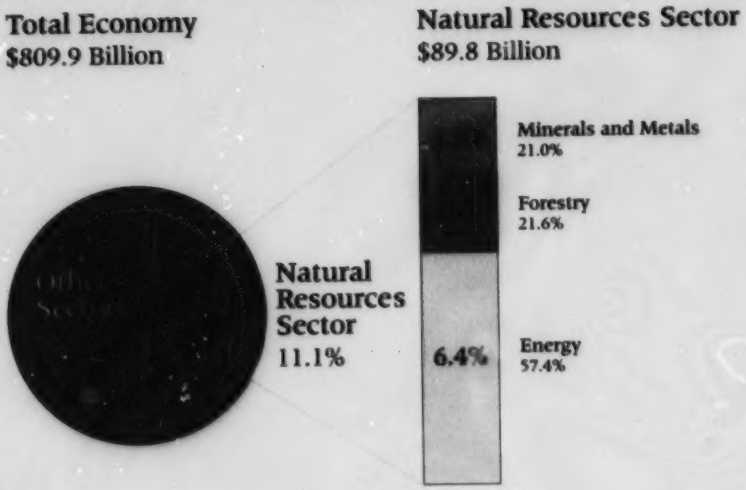
SDS – Now and for the Future underscores that *all* Canadians have a role to play in sustainable development. Ultimately, sustainable development will result from our individual and collective efforts to find solutions to resource development challenges that are good for our communities, good for the economy and good for the environment.

Putting Sustainable Development Into Context

Canada's natural resources provide our society with a high standard of living and an enviable quality of life. This natural resource endowment generates economic opportunities and societal benefits that enrich the lives of all Canadians.

Along with this wealth of opportunity comes the responsibility to use these resources productively and efficiently, and to adopt environmentally-friendly

Natural Resource Sector and Canada's GDP in 1999



Sustainable Development Challenges for the Natural Resources Sector

- To manage forests to sustain a broad range of different values and products
- To provide a safe, efficient, reliable and increasingly environmentally clean mix of energy options
- To recycle and reuse minerals and metals resources to maximize the social, economic and environmental benefits to Canadians
- To generate, analyze and disseminate data, information and knowledge to balance pressures on land use and assist in policy development

Resource development is crucial to our economy, accounting for 11% of GDP and $100 billion per year in exports. Canada's natural resources also underwrite extensive social benefits. More than 3.6 million Canadians in over 650 communities, many of which are rural, northern and remote, rely on the energy, forest and minerals and metals industries. Direct employment in the sector accounts for almost 750, 000 jobs. Wealth created from these jobs supports a high standard of living and the necessary financial resources to invest in social infrastructure such as health and education.

methods and technologies in a manner that is socially responsible. Canada has a lead role to play in setting and maintaining international standards of environmental protection.

The principles of sustainable development enable Canada to build on its social, economic and environmental achievements to protect our natural heritage for the benefit of Canadians and our global neighbours, while maintaining the natural resources sector's extraordinary economic performance and continuing to enhance Canadians' quality of life.

Countless more communities, in countries around the world, depend on a steady supply of Canada's resources for their own economic growth and social development.

Natural resources are equally critical environmental assets. Canada has almost 10% of the world's freshwater, 10% of the world's forests and an estimated 300,000 species of wildlife. As stewards of these precious and indispensable resources, we have a duty to ensure they are used wisely, and to establish policies and programs to conserve and protect these assets.

We increasingly face trade-offs as we try to reconcile the sometimes competing expectations and pressures that arise when integrating economic, environmental and social factors into decision-making.

For example, it is difficult to rationalize the apparent dichotomy when consumers demand action on global warming yet continue to put more cars on the road. At the same time there is a demand for more reliable products and the economic spin-offs associated with their development, there are also calls to protect wilderness areas for recreation and wildlife related activities. Even potential solutions to environmental challenges, such as emerging biotechnology breakthroughs, often raise complex social or ethical issues that defy easy answers.

Striking the right balance sometimes seems elusive. However, there is no option but to find solutions if we are to continue to meet consumers' needs for resource-based products while creating jobs, increasing productivity, expanding export markets, and advancing both our domestic and international environmental stewardship goals and obligations.

Fortunately, in the span of a few short years, sustainable development has moved out of the periphery and towards the mainstream. Organizations, both public and private, are actively seeking ways to operationalize the concept. The challenge of sustainable development demands action at all levels. NRCan, along with most other jurisdictions, applies the Brundtland definition of sustainable development to its work: *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

Based on this definition, NRCan demonstrates that by integrating social, economic and environmental considerations into decision-making we can respect the needs, values and property interests of *all* users of the land and its resources. While taking an integrated approach sometimes poses challenges, it also opens up opportunities to improve our standard of living and enrich our quality of life, both now and for the future.

Moving Forward: NRCan's Contribution to Sustainable Development

At NRCan, sustainable development is not a passing trend – it is the way we do business.

We have committed to productive partnerships with industry, all levels of government, and non-government organizations, educational institutions, Aboriginal organizations and Canadian communities to build on our science and policy capacity to advance sustainable development. An ongoing dialogue with this broad stakeholder base has enabled an in-depth understanding of the most important issues to Canadians in all regions of the country.

NRCan contributes to sustainable development by undertaking scientific research and technology development; by providing information to Canadians; through policy research and development; by forming partnerships both within Canada's borders and abroad; and, by leading by example.

NRCan's vision for the 21st century is grounded in the recognition that knowledge provides a wide range of sustainable development solutions.

Research and development lead to technological innovations that are essential to the growth of knowledge-intensive, value-added industries such as geomatics, cleaner technologies, next-generation recyclables, energy efficient products and services, lightweight materials for vehicles, alternative and renewable energy sources, as well as sustainable forestry practices.

NRCan works in partnership with industry to innovate and to generate growth in the resource sector. The Department also collaborates with the provinces, universities and the private sector to develop advanced technologies that reduce pressures on the environment, create highly-skilled jobs and contribute to sustainable development.

21st Century Challenges

Canada's natural resources sector faces three critical public policy challenges: ensuring that resource development and use are sustainable; remaining internationally competitive in the increasingly knowledge-based and globalized economy; and maintaining an infrastructure and business climate that attracts investment in the natural resources sector. These three challenges exist within the context of the greater domestic and international challenge of meeting the Kyoto targets established in 1997. Policies, programs, legislation, regulations, taxes and spending, as well as consumer awareness, establish the context in which Canadians make sustainable development decisions. These policies need to represent and address the needs and interests of a broad range of Canadians.

NRCan develops regulations in areas such as energy efficiency and explosives, and works with other federal departments to develop focused environmental and health regulations and appropriate fiscal and tax policies affecting resources and resource policies. The Department also works with stakeholders and industry to develop voluntary approaches to sustainable development.

From industry's perspective, policies need to reflect and be responsive to competitive realities in the global marketplace and strengthen the private sector's ability to create jobs while it improves its environmental performance.

Resource management demands knowledge of the many interrelated factors that go into integrated decision-making – including information on soils, bedrock, wildlife, water, air, and climate. Resource managers need to be able to consolidate that knowledge to make informed decisions, including the socio-economic dimensions of resource development.

NRCan provides basic knowledge, information and technologies to address the social, economic and environmental aspects of development. Information programs encourage producers and consumers alike to consider the social, economic and environmental impacts during each phase of resource development and use. NRCan assists decision makers by providing conventional mapping and reports.

Operating Principles

For the first SDS, NRCan adopted a set of operating principles to guide its work in promoting the sustainable development of natural resources. Since then, NRCan has also worked with other government departments to develop a common set of principles for departments to respect in promoting sustainable development.

The following principles (described in more detail in Appendix B) will guide the Department's work for this SDS:

- **Accountability and transparency**
- **Partnerships and consultation**
- **Integrated decision-making**
- **Science and knowledge**
- **Precaution**
- **Anticipation and prevention**
- **Ecosystem integrity**
- **Efficient use of resources**
- **Continuous improvement and innovation**
- **Intergenerational equity**
- **Shared responsibility**
- **Setting an example**

Increasingly, decision makers rely on the Internet to transfer high-quality scientific data to and from users. Partners and clients regularly access NRCan's geoscientific databases this way, as well as from dedicated information centres in provincial facilities.

Canadian consumers also need access to this information to make appropriate judgments about their personal health and safety, the well-being of the environment and economic opportunities.

Many environmental issues transcend political boundaries. This reality, coupled with expanding global trade, is resulting in a greater emphasis on international cooperation. Canada works with other countries and international agencies to address global development issues and to ensure access to markets for Canadian natural resource products, technologies and services.

NRCan's science and technology (S&T) activities support the development of universally accepted standards which help ensure Canadian natural resource products remain competitive. NRCan works with the Department of Foreign Affairs and International Trade, international agencies, provinces/territories, the private sector and other countries to address issues that affect the way Canada develops its natural resources.

Highlights of NRCan's first Sustainable Development Strategy

NRCan and its partners in the public, private and non-profit sectors implemented a number of successful initiatives that have made measurable progress towards sustainable development, including:

- Delivered pilot *Sustainable Communities Initiative* to rural, aboriginal and remote communities to enable communities to participate in land use and sustainable development decision-making
- Advanced earth science expertise and technologies in Latin America, positioning Canada as a world leader in geomatics
- Promoted increased value-added processing of Canada's minerals and metals
- Shared Canadian expertise in sustainable production, use and recycling of minerals and metals
- Provided forest fire managers and community leaders with information to save lives through the Fire Monitoring, Mapping and Modeling System
- Brought together aboriginal and community values to sustainably manage Canada's forests
- Encouraged use of renewable energy through the launch of the Renewable Energy Deployment Initiative
- Updated Departmental Environmental Policy to improve the environmental management system

Government has a key role to play in pursuit of a concept of progress that is based on the development of balanced social, environmental and economic well being. Corporate social responsibility (CSR) is an approach that places value in being a responsible and accountable member of a larger community, and is grounded in meaningful dialogue with the organization's stakeholders and civil society. In a sense, CSR is fundamental in an organization's pursuit of sustainable development.

NRCan works to set a high standard in its own operations, demonstrating that sustainable development is not only viable, but that it is advantageous. The Department seeks to continually improve the quality of working life and environment for its employees by conducting its business in a fiscally, environmentally and socially responsible manner.

NRCan's Evolving Strategy: The First Three Years

NRCan was one of 28 federal departments and agencies that tabled Sustainable Development Strategies for the first time in Parliament in 1997. The initial Strategy was recognized as a key tool to address sustainable development challenges at all levels: policy, science and technology programs, legislation/regulations and departmental operations.

The implementation of the first SDS has led to a number of key accomplishments that have advanced sustainable development. Lessons learned through the first SDS were instrumental in determining the direction for *Sustainable Development Strategy – Now and for the Future*, which will guide NRCan activities through to the end of 2003.

The Department's strong foundation for its SDS was critical to the success of its first strategy. This foundation – which will continue to support *SDS – Now and for the Future* – is composed of three pillars: 1) stakeholder engagement; 2) performance measurement; and, 3) an effective management system.

Stakeholder Engagement

Since the first round of consultations held for the first SDS, NRCan has maintained an ongoing dialogue with stakeholders through progress reports, questionnaires to provide input and comments, a Web site with links to key documents and related work, and face-to-face multi-stakeholder meetings. Public engagement is a key component of the Department's ongoing approach to sustainable development and we are appreciative of the enduring level of interest and support demonstrated by stakeholders.

NRCan will continue to seek the counsel of Canadians as the commitments made under *SDS – Now and for the Future* are implemented. The Department will further strengthen its partnerships with individual Canadians, environmental groups, industry associations, professional associations, academic institutions, private companies, other levels of government and other federal government departments.

Performance Measurement

From the outset, NRCan recognized that a consistent system to measure its performance would be critical to the implementation of the Department's 1997 Strategy. Consequently, the Department realigned its policy goals to match those in the Strategy and developed a single set of performance indicators to meet various reporting needs. The performance indicators, developed in consultation with stakeholders, enable NRCan to measure its performance against the objectives of its SDS. NRCan is now well positioned to report on this established performance measurement framework. These indicators form a vital component of our progress towards the Department's vision of a sustainable future. The performance measurement framework is described in Appendix A.

Effective Management

NRCan uses leading-edge environmental management tools and practices to advance sustainable development through its own operations. It has strong support from senior management and its Sustainable Development Working Group. The Department employs a team approach to the development, implementation and monitoring of the SDS. Reviews of this management system are conducted to ensure accountability and results.

Accountability for Sustainable Development at NRCan

NRCan is committed to implementing its SDS and to holding itself accountable to Canadians for its actions.

The Deputy Minister of NRCan has appointed an Assistant Deputy Minister to act as a champion of the SDS. The Director General of the Strategic Planning and Coordination Branch and the Senior Director of the Sustainable Development and Environment Division are responsible for strategy development, implementation and reporting.

The Senior Director of the Sustainable Development and Environment Division chairs the Sustainable Development Working Group, which is comprised of directors and senior analysts from all sectors and corporate branches.

The Department will seek input from its independent advisory panel, made up of a cross section of interested stakeholders, regarding progress toward SDS implementation and priorities for the future.

The Department will develop and use performance indicators to measure and report on results (see "Measuring the Vision" and Appendix A).

An annual report will be prepared detailing the implementation of this strategy. This report will be reviewed by the Department's Management Committee and published on NRCan's Web site. A summary will be part of the Department's annual report on performance submitted to Parliament.

NRCan will continue to integrate sustainable development accountability into the performance accords of senior departmental managers.

NRCan's Framework for Action

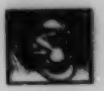
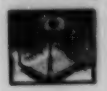
NRCan has developed a series of goals, objectives and actions to advance sustainable development, both in the programs and policies we provide to Canadians, and in our own operations. NRCan's goals and objectives direct every aspect of the Department's activities. These goals, objectives and actions are informed by the ten public issues identified through our consultation process. We have also identified six key themes for *SDS – Now and for the Future* to advance change in the areas that our stakeholders believe we can best make a difference. The following two pages summarize the commitments we are making for *SDS – Now and for the Future*.

Photo courtesy of Alcan Aluminum Limited

A Framework for Action

Issues	Goals	Objectives
	To provide Canadians with:	As demonstrated by:
Promoting Canada as a model of sustainable development Adjusting to changing economic and political circumstances Promoting technology and resource use for sustainable development Creating jobs and building sustainable communities Providing information to Canadians Engaging Canadians Working with partners to advance sustainable development Measuring sustainable development progress Maintaining a healthy environment Ensuring a sustainable future	1 Information to make balanced decisions regarding natural resources	1.1 Easily accessible and integrated knowledge on the state of Canada's landmass and natural resources, and the economic, environmental, and social dimensions of their use. 1.2 Greater national and international cooperation and consensus on sustainable development issues, policies, goals and actions. 1.3 Fiscal, regulatory and voluntary approaches that encourage the sustainable development of natural resources.
	2 Sustainable economic, environmental and social benefits derived from natural resources for present and future generations	2.1 Greater economic opportunities and encouraging investment in innovative and higher-value uses of natural resources. 2.2 Expanded access to international markets for Canadian resource-based products, knowledge, technologies and services. 2.3 Increased capacity of communities to generate sustainable economic activity based on natural resources.
	3 Strategies to reduce environmental impacts in the natural resources sector	3.1 Canada addressing its international Kyoto commitment to reduce greenhouse gases. 3.2 Science, technologies and stewardship practices that reduce environmental impacts, conserve biodiversity, and increase the efficiency of resource development and use. 3.3 Canada's environment safeguarded from the risks associated with natural resource development and use.
	4 Safety and security in the natural resources sector	4.1 Canadians safeguarded from natural hazards. 4.2 A national framework for spatial positioning, mapping and boundary maintenance. 4.3 Safe use of explosives and pyrotechnics. 4.4 Enhanced safety and security in Canada's natural resource sector.
	5 A department that is efficiently and effectively managed	5.1 Managing NRCan's resources responsibly. 5.2 Continuously improving NRCan products, services, and operations. 5.3 Sustainable development in NRCan operations.

Operating Principles for Sustainable Development: Accountability and transparency • Partnerships and consultation • Integrated decision-making • Science and knowledge • Precaution • Anticipation and prevention • Ecosystem integrity • Efficient use of resources • Continuous improvement and innovation • Intergenerational equity • Shared responsibility • Setting an example

How NRCan will make a difference	Where NRCan will make a difference
• Provide targeted knowledge and tools to inform decision-makers. • Develop new national strategies for priority areas. • Develop new tools to advance sustainable development. • Provide targeted education and outreach. • Promote Canadian sustainable development practices internationally. • Develop a national consensus on forest issues. • Analyze options for emissions trading. • Promote innovation in resource development. • Increase market access for Canadian resource-related industries. • Expand efforts to promote international business development. • Develop and disseminate information for community capacity. • Build Aboriginal and community capacity to practice sustainable resources management. • Enable communities to determine their energy options. • Build infrastructure for sustainable communities. • Reduce greenhouse gas emissions. • Undertake science to understand climate change. • Undertake science and technology to reduce environmental impacts. • Develop partnerships to promote biodiversity. • Research and development in support of a diversified energy base. • Undertake science for risk assessment and policy making. • Monitor and address natural hazards and disasters. • Improve Canada's spatial reference infrastructure and the topographic information base. • Promote safe communities by increasing public security related to explosives. • Enhance health and safety for mine workers. • Strengthen Departmental capacity to advance sustainable development. • Measure NRCan's internal environmental, health and safety performance. • Improve environmental health and safety compliance and awareness at NRCan. • Manage hazardous and non-hazardous waste produced by NRCan operations. • Develop and implement strategies to increase the efficiency of energy and resource use in NRCan operations. • Develop a strategy to promote the use of eco-efficient goods and services within NRCan.	Climate change  Corporate stewardship and accountability Innovation Knowledge and information  Leadership and partnerships Sustainable communities

The Public View

As responsibility for sustainable development rests with all Canadians, the Minister of Natural Resources Canada recognized the need to capture the views of citizens with different perspectives on the issue. To ensure *SDS – Now and for the Future* fully reflects these views, NRCan initiated a dialogue with over 2000 stakeholders throughout Canada.

During face-to-face consultations with departmental officials, representatives from industry, government, Aboriginal groups, NGOs, academia and others, Canadians consistently emphasized that NRCan should focus on issues that promise real progress towards the sustainable development of Canada's natural resources (Appendix C contains a summary of the consultations).

Building upon the issue scan from the Department's first Strategy, this SDS endeavours to address what stakeholders have indicated are the current and anticipated areas requiring increased attention in 2000 and beyond. Canadians have told us the following issues must remain top of mind, and that NRCan should direct its efforts to address these issues.

Promoting Canada as a model of sustainable development

In order to promote Canada's success in advancing sustainable development, both at home and abroad, we must demonstrate our country's capacity for innovation. Industry and government need to effectively communicate the ways we contribute to the development of the natural resources sector by integrating knowledge and technologies that minimize waste, energy use and emissions.

Canada's reputation internationally affects our economy and trade opportunities. In order to expand these opportunities, the resource industry must be recognized globally for smart resource development.

To this end, NRCan will be an exemplary department – demonstrating the efficiency and effectiveness of sustainable development in its own operations, and sharing its experience and knowledge with other private and public organizations. Canada has information that may benefit other countries. Our ability to use natural resources responsibly, to mitigate potentially detrimental environmental impacts from resource development and to develop technologies for continued innovation can be transferred to resource managers worldwide. NRCan must work to raise global awareness that sustainable development goes beyond simply sustaining the quality of life we now have, that it is an opportunity to build a *better* quality of life.

Adjusting to changing economic and political circumstances

Globalization impacts the interrelationships among governments as well as between governments and citizens, and, consequently, on government policy choices.

In the 1997 Strategy, we acknowledged that meeting global responsibilities was important and, indeed, this is still the case. However, in the intervening years the playing field has been altered and the ways in which we meet these responsibilities have changed.

The issues:

- Promoting Canada as a model of Sustainable development
- Adjusting to changing economic and political circumstances
- Promoting technology and resource use for sustainable development
- Creating jobs and building sustainable communities
- Providing information to Canadians
- Engaging Canadians
- Working with partners to advance sustainable development
- Measuring sustainable development progress
- Maintaining a healthy environment
- Ensuring a sustainable future

Aboriginal land claim settlements, new international obligations related to climate change and biodiversity, and stringent environmental regulations leave society facing tough sustainable development decisions.

In the time it takes a tree to grow, we have moved from forest exploitation to international scrutiny of our forest management practices. Many consumers, especially those in foreign markets, are placing more emphasis on environmental values in their purchasing decisions.

These challenges are compounded by the fact that the rate of change is accelerating. In an age of instant communications and global connectedness, the future is coming at us at an incredible speed.

All countries and all sectors of the economy are subject to these changes. The business climate of the 21st century, characterized by increasing market integration, developments in information technology, and unparalleled process and product innovations, will mean that leading economies like Canada cannot operate in isolation. Canada's relationships with other governments, our activities in foreign exchange, our import and export activities will ultimately affect sustainable development.

Furthering the sustainable development of natural resources and having access to a rules-based global market place is in Canada's enlightened self-interest.

Promoting technology and resource use for sustainable development

Average productivity growth in the natural resources sectors has been three times higher than the rest of the economy over the past two decades. The sustainable development challenge for industry, governments and individuals will be to ensure that continued economic development and social well-being are compatible with ecological support systems.

Canadian industry and consumers would benefit from further improvements in resource efficiency, by developing materials, products and industrial processes and services that are more eco-efficient.

For example, NRCan programs help to improve efficiency in the use of energy. Other programs encourage better utilization of renewable resources such as forests and greater use of wind and solar power. There is also a need for Canada to refine the ways we harvest used timber products and recycle minerals and metals.

NRCan's advances in science and technology can help drive the transition toward a less energy- and material-intensive society to one of a more sustainable energy and materials mix.

Horizontal Themes for Sustainable Development across the Government of Canada

To advance sustainable development at the federal level, departments and agencies have begun to coordinate their activities in eight thematic areas. The themes are:

i Sustainable Development in Government Operations
ii Productivity through Eco-efficiency
iii Sustainable Development Knowledge and Information/Indicators and Reporting
iv Sustainability in Communities
v Federal Sustainable Development Strategy for the North
vi Sustainable Development and Healthy Canadians
vii International Aspects of Sustainable Development
viii Social and Cultural Aspects of Sustainable Development

These themes are cross-cutting in nature and their influence is broader than just one single department or agency. As such, these themes are shaping NRCan's SDS as well as the strategies of other federal departments and agencies.

NRCan is co-leading the first four of these eight themes and is an active participant in the fifth.

Creating jobs and building sustainable communities

Natural resources are the lifeblood of 3.6 million Canadians in more than 650 communities, many of which are rural, remote, northern and Aboriginal. Canadian communities are undergoing dramatic changes as a result of the transition to a knowledge economy and are confronted with multiple social, environmental and economic challenges. Rural areas face cyclical economic downturns, loss of traditional industries, changing demographics and concerns over environmental degradation. Urban areas face increasing demands

on the life support systems, such as air, water and infrastructure, as cities and towns continue to grow.

In spite of the complexities of these issues, there are opportunities arising from these challenges. What communities require to seize the potential of the knowledge-based economy are the skills, tools and information to capitalize on change.

NRCan works to increase the capacity of Canadians to generate, obtain, use and discuss geographical information in order to ensure that citizens in these communities are heard and their needs met. Improved communication and consultation tools, along with more effective partnerships with other government departments, other communities and the private sector, will strengthen the ability of Canada's Aboriginal, rural and northern communities to plan, make decisions and share valuable best practices crucial to sustaining the livelihood of these communities.

Providing information to Canadians

Many people cite the environment as a top priority but do not connect their actions with environmental consequences regarding the products we consume, the habits that form the routines of our daily lives and the impacts of our individual actions. Making balanced decisions that take into account a broad range of social, economic and environmental aspects of our actions can be difficult and time consuming.

To make sustainable development a reality, Canadians require knowledge to inform their decisions and the actions they take.

Shifting towards sustainable choices demands readily accessible information and positive reinforcement. Research on sustainable development issues, and the transfer of that knowledge to the broader public, is critical to achieving Canada's sustainable development goals. NRCan's efforts to close the gap between acquiring and disseminating knowledge will lead to more sustainable activities.

Engaging Canadians

As a science-based department, NRCan has a great deal of information to share, but it also has a lot to learn from others. Resource dependent communities want a say in their collective futures. Similarly, those who live in urban areas are seeking solutions regarding the amounts of waste generation, transportation systems and their contribution to greenhouse gas emissions, among others.

Canadians want assurance that their input will be considered and incorporated when making decisions about the sustainable development of the country's natural resources. NRCan will seek the advice and perspectives of all Canadians through ongoing stakeholder engagement, by encouraging them to participate as informed parties in this process.

Working with partners to advance sustainable development

Sustainable development, by its very nature, requires the integration of input and feedback from diverse disciplines. Sustainable development issues also often transcend community, provincial and federal boundaries and jurisdictions. Consequently, it is essential that governments work together and with others outside of the public sector to move sustainable development initiatives forward.

Canadians want greater cooperation among different sectors and jurisdictions. They believe NRCan should pursue its responsibilities in partnership with an array of stakeholders and in ways that complement the work of other partners committed to sustainable development progress.

NRCan recognizes gains will be realized through openness to new approaches and adaptation to new knowledge, technology, information and ideas. We are committed to better coordination of sustainable activities and greater participation in shared opportunities – with other governments and departments at all levels, communities, industry, associations and individuals – through integrated planning and co-operative implementation.

Measuring sustainable development progress

Indicators such as groundwater quality, the stock of our forests or the take-up of recycling by industry can let us know if we are on track towards a healthier environment, a prosperous economy and a sustainable society. Progress can occur, and be measured, on a number of levels including the international, national, provincial, community and corporate arenas and, even, at the individual level.

Management tools and systems, targets and indicators are necessary to let Canadians know if we are moving in the right direction. They can also reveal areas requiring further action. As our understanding of the factors that influence sustainable development expands and deepens, there is a need to calibrate and communicate new knowledge to Canadians. A proactive approach to planning and corrective action is necessary in the short term to ensure longer term benefits.

NRCan's contributions to the development of criteria and indicators for sustainable development, as well as the dissemination of this knowledge, is essential to ensuring all stakeholders recognize where they can make a difference and take action within their areas of influence.

Maintaining a healthy environment

The need to act as stewards of our natural resources vs. the immediate economic benefits from its use are often in conflict. This reality demands "smart" resource development that strikes the right balance – resulting in a healthier environment and the assurance the integrity of ecosystems is not at risk, while ensuring ongoing economic growth through the development of green resource products, services and processes.

Increased education, dissemination of information, dialogue with stakeholders, working with partners, development of technology, legislation and management systems are all mechanisms that NRCan employs to address these trade-offs and to achieve results.

Ensuring a sustainable future

It is incumbent on Canadians, as stewards of a significant part of the earth's environment and resources, to demonstrate global leadership in sustainable development and to support the efforts of other countries as they adopt sustainable development practices.

NRCan must be a proactive partner, both domestically and internationally, supporting the efforts of governments, industry, communities and individuals to capitalize on knowledge and technology to generate economic growth and environmental solutions that meet the needs of society, now and in the future.

NRCan's Six Priorities for Action

The previous section described the key public issues that will determine the realization of NRCan's vision of a sustainable future. As an advocate for natural resources, NRCan has the ability to play a fundamental role in moving Canada towards a more sustainable future. However, our stakeholders have told us that we should not try to be all things to all people. There are specific areas within our realm of expertise where we have the capacity to make a difference – areas where we should consolidate our efforts.

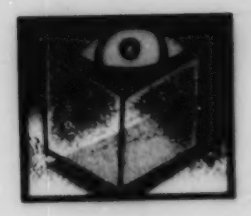
NRCan is focusing on six themes to streamline and better coordinate our activities over the three year period of *SDS – Now and for the Future*, to best address these public priorities. The six themes, represented by icons, will appear throughout this document. The first three – corporate stewardship and accountability; knowledge and information; and leadership and partnerships – refer to ways we do business, while the last three – climate change; innovation; and sustainable communities – refer to specific ends that NRCan will help to address. As many of the actions reach across these thematic areas, some will be illustrated with more than one icon.

Corporate stewardship and accountability

If NRCan is to lead by example, it must "walk the talk" and manage itself in a responsible manner that respects the three pillars of sustainable development. For the Department to achieve its business and sustainable development goals, we must integrate environmental, economic and social growth opportunities into our day to day practices. We must also be held accountable – both to staff and stakeholders – for continuous improvements within the organization.

In both the public and private sector, those organizations that measure and evaluate the results of their work find that it builds support within and outside the organization. This over-arching theme permeates the way NRCan conducts its business and is integral to all aspects of the SDS.

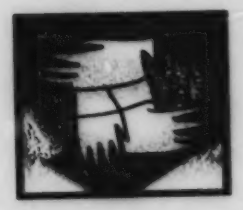
Over the course of *SDS – Now and for the Future*, NRCan is committed to managing the Department through long-term considerations and ensuring that individuals understand the indicators or benchmarks by which our progress is measured.



KNOWLEDGE AND INFORMATION

As sustainable development depends on our individual and collective actions, there is a need to gather, produce, share and communicate knowledge and information with Canadians – of all ages and all walks of life – on the importance of sustainable development to our standard of living and quality of life. This applies equally to government officials, private sector developers, community planners or individual Canadian families. We all need to be aware of the consequences of our actions.

Canadians expect the federal government to play a leadership role in providing them with the knowledge they need. Given the importance of natural resources in our everyday decisions, NRCan must be able to create, share and communicate the knowledge and information Canadians require.



LEADERSHIP AND PARTNERSHIPS

The road towards sustainable development requires collective action, but it also requires leadership driven by a vision, direction and specific actions – many of which need to be undertaken by the public sector. At the same time, it necessitates partnerships, as no single department, organization, company or individual can advance sustainable development in isolation.

Building upon our strengths and credibility with our stakeholders, NRCan is ready to engage partners involved in the production and consumption of natural resources with the opportunities sustainable development presents. NRCan will lead other federal departments, other governments, the private sector, non-governmental organizations, Aboriginal and community groups in the key areas that will advance sustainable development of Canada's natural resources.

CLIMATE CHANGE

Under the 1997 Kyoto Protocol on global climate change, Canada made an international commitment to reduce its greenhouse gas (GHG) emissions to six percent below the 1990 level by the period 2008-2012. NRCan has primary responsibility for the domestic implementation of climate change initiatives. Our actions contribute towards the mitigation of climate change, as well as our ability to understand, predict and adapt to the impacts of climate change. Technologies developed to address climate change will provide both national and international benefit.

NRCan priority areas for action through to the end of 2003 will include: addressing market barriers to adopting energy efficiency and renewable energy technologies; enhancing access for individuals, companies and communities that wish to adopt these technologies; and, increasing our contributions to innovative technologies. Further, we will continue to provide Canadians with the education and information they need to understand the consequences of climate change on our planet and to make better informed decisions about their use of energy and actions to adapt to climate change.

Innovation

Many Canadians increasingly regard innovation as a new national imperative to succeed in the global, knowledge-based economy. Governments and industries are recognizing that it is only through the generation of better ideas and the implementation of innovative products, services, and processes that Canada will be able to truly achieve its sustainable development goals. Governments have a unique role to play in providing the vision, coordination, knowledge and strong leadership needed to catalyze a more strategic approach to creating innovations to enable sustainable development within the natural resource sector.

NRCan's approach to innovation will engage stakeholders and communities across all regions of Canada. Natural resource-based firms have identified insufficient R&D and related networks and shortages of highly skilled workers as principal barriers to innovation. The innovation policy framework of NRCan calls for: the creation and sharing of scientific research, developing skilled knowledge workers, support for commercialization, and business and market development assistance.

Canada's overall innovation and sustainability record will be strengthened with resource sector solutions. The wealth of scientific and technical knowledge NRCan provides enables a strengthened stewardship of our natural resource endowment. The applications of innovative new ideas and technologies will yield economic, environmental, health and social benefits for all regions and will contribute to a higher quality of life for Canadians.

Sustainable Communities

Sustainable communities are those which add value to natural resources and reap the rewards of this approach in terms of jobs and prosperity that continue for future generations. A sustainable community empowers itself to achieve a common vision for the future, and effectively responds to change through community based integrated decision making, increased resilience and economic self reliance, and sound environmental stewardship. Sustainable communities have the collective capacity to "get things done."

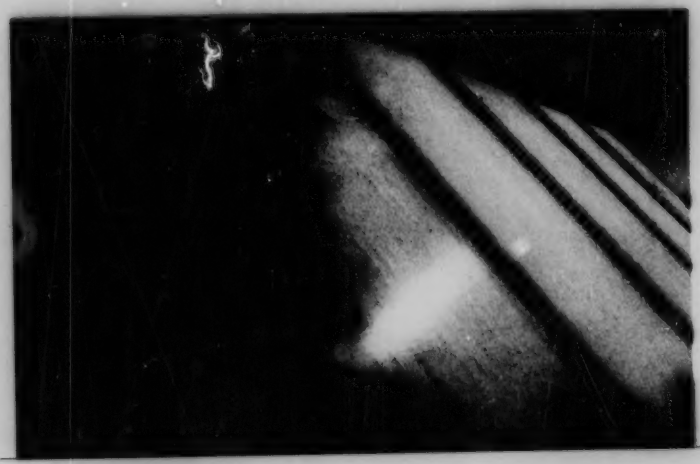
Communities in Canada are experiencing change and are facing complex social, environmental and economic challenges. They are subject to the cyclical nature of commodity prices, the disappearance of traditional industries, environmental degradation, lack of access to technology, and changing demographics to name a few. In keeping with the philosophy that necessity is the mother of invention, these constraints can present unique opportunities. As communities capitalize on information networks, technologies and partnering possibilities, they are discovering the potential for new value-added industries, resource development, tourism, etc.

NRCan will work towards sustainable community development in a more comprehensive manner to enhance opportunities and cushion the changes that occur. Over the next three years we will strive to maintain Canada's natural resource endowment while strengthening social capital, and we will increase local capability to benefit from the transition to a knowledge-based economy.

Vignette: the Climate Change Challenge

Over the past decade, changes in climate and the accelerated pace of the earth's warming have moved the issue of climate change to the top of the global agenda. Addressing climate change is one of the greatest environmental, social and economic challenges ever undertaken by Canada. NRCan plays a key role in developing and implementing Canada's response by virtue of its mandate for the sustainable development of many of Canada's natural resources.

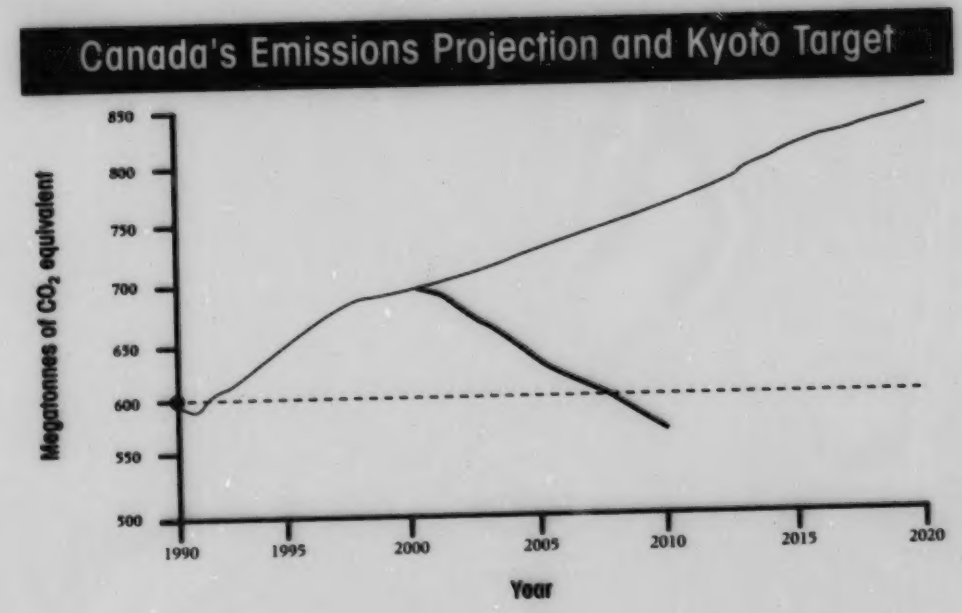
The challenges of climate change illustrate the complexities of sustainable development. The build up of greenhouse gases (GHGs) in the atmosphere – mainly a result of the production and combustion of fossil fuels – could contribute to climate change by increasing the Earth's mean temperature, which many models predict could include an increase in the Earth's temperature, altered precipitation patterns, rising sea levels, and more frequent extreme weather events (tornadoes, hurricanes). At the same time, these fossil fuels have been a part of the high standard of living and contemporary lifestyles of Canadian consumers, as well as the effective functioning, development and competitiveness of the Canadian economy.



Climate change is a crucial sustainable development issue with implications for the environment, the economy and society. Of necessity, our climate change responses will affect how we produce and consume energy, and utilize forests, peatlands, lakes and agricultural soils as carbon sinks to biologically sequester GHG emissions, as well as the capture and storage of anthropogenic CO_2 in geological formations.

The Minister of Natural Resources has the lead for the domestic implementation of federal policies and measures to reduce greenhouse gas emissions. NRCan is well-positioned to contribute to the climate change file, given its expertise in energy, forestry, mining, earth sciences and remote sensing. Working collaboratively with other federal departments, NRCan advances action on climate change in the areas of science, impacts and adaptation, new technologies, energy efficiency, renewable energy and alternative transportation fuels, nuclear energy, forestry, observing and assessment systems, economic and energy use analysis and modeling, and policy development.

NRCan also plays an important international role in climate change negotiations including: policy development for climate change mitigation and adaptation; engaging developing countries through capacity building and market opportunities for technology development and transfer; leading or participating in global science committees; participating in the development of global observation, as well as assessment capabilities and programs.



Source: Natural Resources Canada, Statistics Canada

What this indicator shows

In 1997 in Kyoto, Japan, Canada committed to reducing its greenhouse gas (GHG) emissions by 6% below 1990 levels in the period 2008-2010. The Protocol sets out reduction targets for GHG emissions targets averaging 5.2% from 1990 levels by 2008-2012 for industrialized countries. This chart shows Canada's emissions for the 1990-1999, with "business-as-usual" projections to 2020.

For Canada, emissions continue to grow, but at a reduced rate. This indicates that progress has been made, but that much more needs to be done. Moreover, Canada only produces about 2% of global GHG emissions. Our total annual emissions are equivalent to the two-year growth in China's emissions alone (China is not a signatory). This underscores the need to involve the less-developed countries in finding mechanisms to limit GHG emissions while at the same time allowing them to develop their economies.

Implications for sustainable development

All countries produce GHG emissions to a greater or lesser degree, and those emissions do not respect national borders. It is therefore important that all nations accept the need to address climate change, and to develop mechanisms that lead to sustainable development while minimizing GHG emissions.

Our Approach

Responding to climate change from a sustainable development perspective necessitates strategies that are both mitigative and adaptive to protect and enhance the natural environment and the socio-economic well-being of Canadians. A risk management approach that is phased – in response to clarification of international agreement developments and domestic capabilities – and which addresses growth and development, competitiveness and regional issues is essential. In addition to helping to improve the sustainable development practices of resource-based industries, these responses produce ancillary benefits including cleaner air and improved human health.

Our Priorities for SDS – Now and for the Future

Improve Scientific and Analytical Understanding

NRCan's analytical work on carbon budget modeling, GHG emissions projections, modeling and analysis of the economic impacts of mitigative response measures, and the need/potential for adaptation to climate change will contribute to the body of knowledge upon which policy decisions are made. Expanded scientific research will focus on increased satellite-based mapping and innovative on-line service, and forest information systems to enhance the sustainable development of forests.

Strengthen Mitigative and Adaptive Responses

As its contribution to the Government of Canada Action Plan 2000 on Climate Change, NRCan will build on and expand mitigative initiatives including CO_2 capture and storage, fuel cell vehicle infrastructure, vehicle fuel efficiency and emerging renewable energy. NRCan leads the national impacts and adaptation program. It is developing a Climate Change Impacts and Adaptation Research Network (C-CIARN) with the provinces and other parties to determine pragmatic adaptive responses.

Undertake R&D to Develop New Technologies

The Department supports the development and marketing of renewable and alternative energy technologies, as well as hydrocarbon technologies to reduce emissions and enhance efficiency, mainly through the Renewable Energy Deployment Initiative, the Program for Energy Research and Development and Technology Early Action Measures. Innovations developed during this SDS will be financed under the federal Sustainable Development Technology Fund, Action Plan 2000, and the First National Climate Change Business Plan.

Increase Public Awareness and Understanding

NRCan has a number of programs that provide information and advice to affect consumer behaviour in the consumption of energy and, thereby, help reduce GHG emissions. NRCan will work with Environment Canada and the provinces to establish regional information "hubs" to inform stakeholders about climate change and mitigative options.

Enhance National and International Coordination

NRCan plays an important role in the federal-provincial co-management Baseline Protection Initiative (a means to encourage private sector GHG reduction initiatives), as well as the ongoing development and elaboration of the First National Climate Change Business Plan. NRCan will continue to collaborate with the Department of Foreign Affairs and International Trade, and Environment Canada in ongoing Kyoto Protocol negotiations to protect global and Canadian interests.

Goal 1: To provide Canadians with information to make balanced decisions regarding natural resources

OBJECTIVES

- 1.1 Accessible, integrated knowledge
- 1.2 Cooperation and consensus
- 1.3 Policy instruments

Sustainable development is about making better-informed choices: finding ways to integrate economic, environmental and social dimensions into decisions about the development of natural resources. Governments at all levels require appropriate data and knowledge on which to base policies and programs. Organizations large and small require information that is specialized to their needs. Individual Canadians need objective information to choose, purchase, use and dispose of goods and services. In all cases, Canadians must have access to scientific and community-based knowledge, in an easily accessible format.

NRCan advances the sustainable development of Canada's natural resources by providing comprehensive information and the latest scientific knowledge, by fostering consensus on key issues and actions, and by developing innovative policies that actively promote sustainable development. NRCan has expertise in surveying, mapping, remote sensing, geographic information systems and geoscience research. The Department is increasing Canadians' ability to assess sustainable development progress through the development of analytical techniques, criteria and indicators to identify key environmental, economic and social elements of sustainable development. There are encouraging signs of progress on multiple fronts.

The challenge for this goal is to enable *all* Canadians to access leading-edge, high-quality and relevant data, knowledge and information, and to facilitate and promote its use.

1.1 Accessible, integrated knowledge

Accurate, objective information is critical for smart resource decisions by individuals, communities, local decision-making agencies such as municipalities and conservation authorities, private industry and government departments and agencies. NRCan's information assets and clients vary broadly, supporting sustainable development at the local, regional and national levels. Under this objective, NRCan, in consultation with stakeholders, has identified four priority areas: provide targeted knowledge and tools; develop new national strategies in priority areas; develop new tools to advance sustainable development; and provide targeted education and outreach.

Action: Provide targeted knowledge and tools to inform decision-makers

Issue	Approach	Target
The Government of Canada is committed to better connecting to its citizens. As its contribution to this objective, NRCan has a responsibility to improve and increase the electronic dissemination of its natural resources data, information and knowledge to help Canadians make better sustainable development decisions.	NRCan will enhance its ability to create and disseminate knowledge about Canada's natural resources by: adapting information and computer technologies to the methods of science; facilitating innovation by diffusing knowledge products to Canada's resource industries; enabling wise stewardship by integrating data, information and knowledge from many domains to address complex natural resource issues; supporting community sustainability by providing regional lenses, analysis tools and scientific models to support natural resource decision-making.	By 2003, provide up to 14 on-line services on the natural resources sector, as part of Government On-Line, including a Canadian Natural Resources Knowledge Gateway.

Anticipated outcome

The source for informed decision-making in the sustainable development of Canada's natural resources.

Government On-Line

The world is undergoing a fundamental socioeconomic change from an industrial society to an information society and a global knowledge-based economy. Societies and organizations that do not adapt to these changes will become increasingly marginalized. Conversely, those that adapt successfully will be in an excellent position to create wealth and enhance the well-being of their citizens and clients.

The Government of Canada has clearly recognized the need to adapt to the new order. The Government On-Line (GOL) initiative has been established to accomplish this goal.

The objective of GOL is to enhance electronic delivery of information and knowledge about government services and programs provided to Canadians. GOL aims at rethinking how the government conducts its business and integrates an e-business perspective into day-to-day decisions. The key areas addressed are: service transformation, human resource, technology, communications, and risk management.

In this context, NRCan will adapt information and computer technologies to promote and enhance the generation and dissemination of knowledge to support sound decision making on the sustainable development of Canada's natural resources for the social, economic, and environmental well-being of Canadians.

Issue	Approach	Target	Anticipated outcome
Information on the seabed, plant and animal life of Canada's underwater lands is essential to those whose socio-economic conditions are governed by the ocean – in particular offshore resource companies, fishing industries and policy makers (under the Oceans Act), and, the Department of National Defence for sovereignty issues.	Provide state-of-the-art imagery that will serve as the information base for the sustainable development of seabed resources through strong partnerships between federal departments, universities and the private sector.	By 2002, deliver a successful demonstration project to prepare a suite of hard-copy and digital maps, and design a set of national production standards to be used as templates for future projects. By 2003, launch the delivery of data, analysis, and maps for priority areas of the Canadian offshore.	*Contribute to sound environmental management and decision making by increasing the visibility and knowledge of renewable and non-renewable resources in their natural ecosystem and facilitating broad-stake holder engagement in decision making.* *Enhance sustainable development by improving stock assessment and ecosystem management.*
Policy makers and the general public require sustainable development information that can be cross-theme related and that reveals geographical diversities. Efficient access to this information requires a geospatial information infrastructure that links science, policy and society. Informed sustainable development decision making also requires integrated assessment tools that allow the possibilities for sustainability to be explored, given different societal choices. The 6th edition of the National Atlas of Canada is a valuable Web-based geographic information source with over 30,000 user sessions per week. The Atlas has the potential to become a policy support tool that is capable of meeting requirements of policy- and decision-makers at all levels, as well as an outreach tool for Canadians.	Extend the integrated geospatial information and knowledge base of the Atlas to address major sustainable development issues. Develop the Atlas as the national, integrated geographical lane for the communication of sustainable development data, information and knowledge, and policy programs. Develop the Atlas as a national, integrated infrastructure for the access and dissemination of geographical data, information and knowledge on sustainable development. Develop a national, integrated scenario-building tool that allows for the exploration of plausible futures related to sustainable development, given different societal choices. Other government departments will be extended opportunities for partnership. This initiative links to efforts to develop sustainable development indicators	By 2003, create a series of maps to address sustainable development issues in an integrative manner and in a geographical context. By 2003, make the Atlas available as an integrated geographical lane for the dissemination of sustainable development indicators. By 2003, develop a prototype of a distributed architecture that enables sustainable development-related information to be visualized in an integrated Atlas context. By 2003, undertake public consultation on the development of an assessment tool that allows for the exploration of future sustainability scenarios of Canada.	**Anticipated outcome** *An on-line, national integrated geographical information service and communication tool that is capable of supporting policy processes to advance sustainable development.*

Issue	Approach	Target	Anticipated outcome
Indicators can support sound decision making which integrates environmental, social and economic considerations. Policy makers and stakeholders need indicators to provide a measure of our progress towards sustainable development.	With stakeholders, develop indicators to measure the contribution of energy, minerals and metals to sustainable development. With stakeholders, review the Canadian Council of Forest Ministers Criteria & Indicators Framework to ensure that it still reflects current values and new knowledge. Discuss the merits of establishing targets or benchmarks for the indicators. Partners include social and environmental NGOs, other government departments, Aboriginal groups, academia, and industry. Links to other efforts include the federal Policy Research Initiative, the work of the National Roundtable on the Environment and the Economy, Environment Canada, Statistics Canada, provincial governments and international organizations.	By 2001, publish sustainable development indicators for energy. By 2003, publish sustainable development indicators for minerals and metals. By 2002, report to the Canadian Council of Forest Ministers on the review of the 1995 Criteria & Indicators Framework.	*A system that identifies emerging trends and issues for attention of policy makers, and enables decision-makers to judge their progress in contributing to the sustainable development of natural resources.* *Widely accepted indicators for all dimensions of sustainable development – social, economic and environmental.*
New and innovative technologies are required in the future to alter the relationship between economic growth and environmental concerns. Developing insights into what the future may hold, helps in developing policies and programs for NRCan.	Development that is truly sustainable for future generations can be achieved most readily if Canadians share a vision of the future. NRCan will develop a vision for a sustainable future to be used in departmental science and technology strategic planning.	By 2001, identify key technologies and undertake a series of workshops with stakeholders, to develop a vision of Canada's energy system to 2020.	**Anticipated outcome** *Advise Departmental research and development investments which will drive Canada's long term sustainable development objectives and reduce green house gas emissions.*

Action: Develop new national strategies for priority areas

Issue	Approach	Target
A healthy environment depends on a safe and reliable water supply. Geological science information is key to quantify groundwater resources, in order to assess stress levels and limits of the natural replenishment of aquifers. Government agencies at all levels, policy makers, and the groundwater users of Canada rely on this information in support of sound groundwater management.	Launch a process to accelerate existing federal scientific studies on groundwater mapping, groundwater dynamics and monitoring networks. This will lead to an initial national synthesis of the main groundwater reservoirs in Canada. The first step into pursuing this goal is to prepare a national groundwater strategy. Building national partnerships is essential to the preparation of this national strategy. Partners include provincial and federal agencies such as: Environment Canada, Agriculture and Agri-Food Canada, and provincial ministries of the Environment.	By 2002, produce a National Groundwater Strategy outlining federal, provincial and territorial actions, including written agreements with departments and provinces. By 2003, generate a unique national groundwater database that will be used to prepare the national synthesis of the main groundwater reservoirs in Canada.
As Canadians, we need the means to improve our ability to assess the current state of our forests and progress in meeting our national and international commitments towards sustainability. Objective and accurate information on the state of Canada's forests is critical to advancing sustainable development of these resources.	A National Forest Information System will acquire, integrate, process and disseminate data and information to support analysis of, and reporting on, forest issues. A Steering Committee will examine opportunities for cooperation and coordination with other government departments and agencies and non-government organizations.	By 2001, propose a governance model for and the infrastructure of a National Forest Information System to the Canadian Council of Forest Ministers.

Anticipated outcome

Provide a national reference document that will be used by federal departments, provinces and territories to address emerging groundwater issues in a national, coordinated and strategic way.

Anticipated outcome

A National Forest Information System with the ability to measure and report in a timely and authoritative matter on the sustainability of Canada's natural resources.

Vignette: SeaMap

SeaMap is a new initiative to map Canada's offshore lands and the Great Lakes. This cross-departmental initiative (NRCan, DFO) will provide a seamless snapshot of Canada's onshore and offshore territories through high resolution images that display the shape of the sea-floor, sediment cover and benthic habitat (the flora and fauna at the bottom of an ocean, sea or lake). This knowledge is essential to apply the ecosystem-based precautionary approach to sustainable development of offshore resources.

Collaborative efforts between DND, DFO, and NRCan in seabed mapping were poignantly demonstrated in the results achieved during the Swiss Air 111 incident, when the best available tools were brought into play to meet the demands of the search and recovery operation. The mapping done was key to the efficient and timely completion of the search operation.

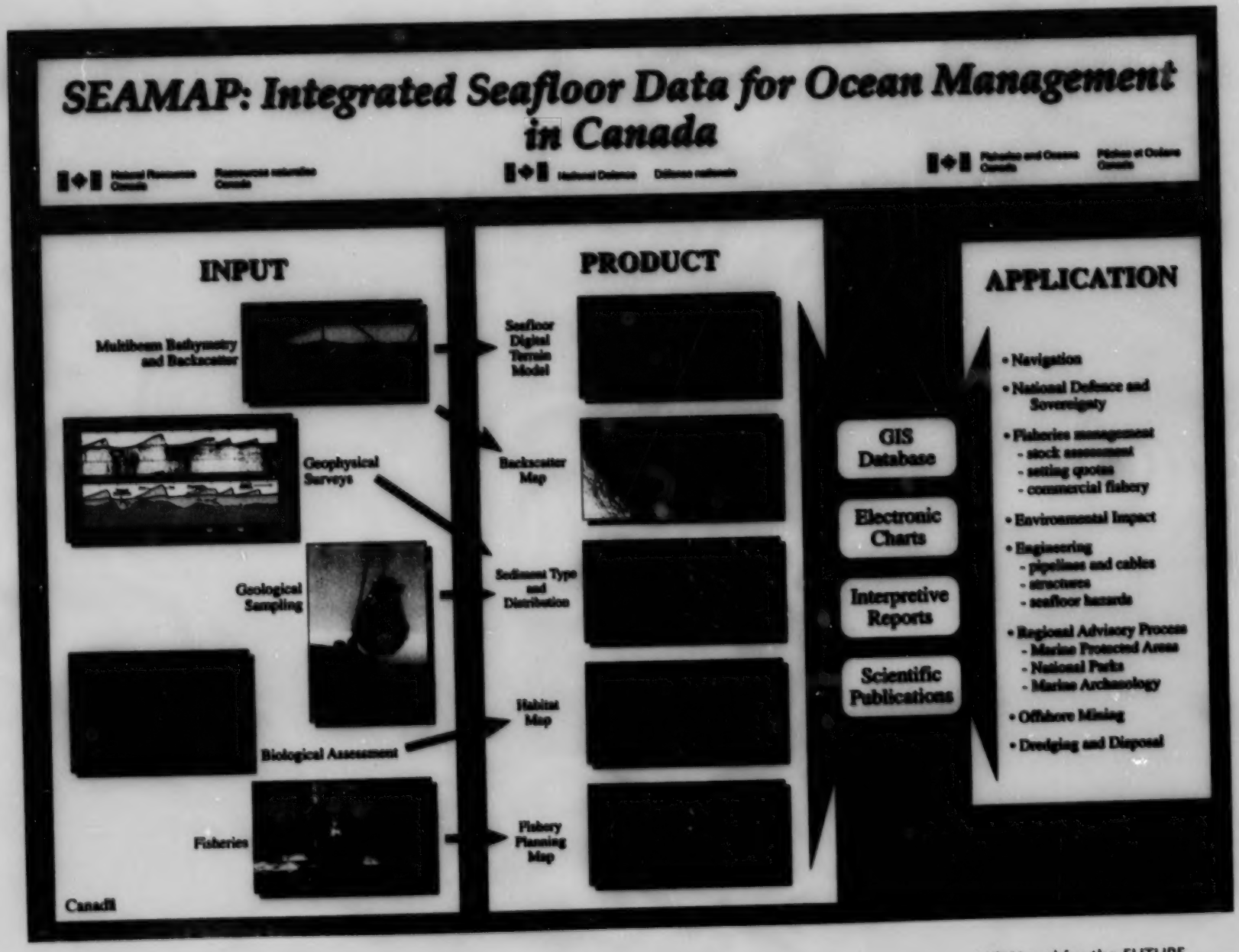
Detailed mapping of the seabed can provide the necessary framework to understand the evolution of the seabed. This knowledge is fundamental to providing sound advice on the effects of human activities such as pipelines and cable routing, the impacts of offshore dumping, the mapping of offshore hazards including landslides, and minimizing environmental impacts of resource extraction.

Detailed information on bathymetry (the measurement of depth in oceans, seas and lakes) and sediment, when correlated with information on benthic communities and catch statistics, will allow fishers to harvest species from small areas where the environmental conditions cause specific species to be concentrated. Data and interpreted maps from a demonstration project on Browns Banks, south of Nova Scotia, have been transferred to electronic charts and proven extremely beneficial to both sustainable management of the scallop fishery and the efficiency of the fishing industry. The benefits of targeted and strategic fishing include a 75% reduction in effort to catch set quota and a parallel reduction in habitat disturbance and preservation of environmental quality.

The Figure illustrates the core elements of the SeaMap program:

- data acquisition from hydrographic, geological and biological surveys
- data processing to produce interpretive map products
- archiving and accessing of data on line through a central data warehouse

The products from SeaMap provide key information for sustainable development of ocean resources.


SEAMAP: Integrated Seafloor Data for Ocean Management in Canada
INPUT
Multibeam Bathymetry and Backscatter
Geophysical Surveys
Geological Sampling
Biological Assessment
Fisheries
PRODUCT
Seafloor Digital Terrain Model
Backscatter Map
Sediment Type and Distribution
Habitat Map
Fishery Planning Map
GIS Database
Electronic Charts
Interpretive Reports
Scientific Publications
APPLICATION
• Navigation
• National Defence and Sovereignty
• Fisheries management
- stock assessment
- setting quotas
- commercial fishery
• Environmental Impact
• Engineering
- pipelines and cables
- structures
- seafloor hazards
• Regional Advisory Process
- Marine Protected Areas
- National Parks
- Marine Archaeology
• Offshore Mining
• Dredging and Disposal

Action: Develop new tools to advance sustainable development

Issue	Approach	Target	Anticipated outcome
The growing demand for certified forest products in the marketplace is of concern to Canada's forest sector as it could have potentially serious trade implications. Canada has an opportunity to lead the world as a model of sustainable development. To do so, we must be recognized at home and abroad as smart, environmentally-friendly, innovative and effective resource managers.	Consult with interested parties – including industry, environmental non-government organizations, aboriginals and labour – on options for the development of appropriate and effective standards and an equivalency framework for Canadian certification systems.	By 2001, report to the Canadian Council of Forest Ministers on the consultations to advance the implementation of certification in Canada's forestry.	*A national certification system that respects regional diversity of Canadian forestry circumstances and the various certifications systems currently under development.*
The pursuit of sustainable forest management is a dynamic and evolving process: the capacities of information systems have increased, the approaches to forest inventories have changed, and the availability of data has improved. Advances in science have increased Canada's understanding of systems, and presented opportunities for new ways to gather information.	Establish Earth Observation for Sustainable Development of Forests, a multi-year project to create, with advanced space technologies, a monitoring system to meet Canada's national and international commitments towards global sustainability.	By 2003, develop methodologies and testing systems to establish the Earth Observation for Sustainable Development of Forests.	*Timely and accurate information for the sustainable management of Canada's forests.*
Decision-makers currently have a good understanding of the environmental and economic dimensions of sustainable development, but require more complete knowledge of the social dimensions in order to measure it and integrate it with the other two components. Better understanding of the social component of sustainable development is required in order to advance sustainable development. Industry, government and non-government organizations will benefit from the development of a knowledge base to share leading practices.	Undertake consultations on social issues related to minerals and metals development, and establish an inventory of leading initiatives by industry, which promote the social aspects of sustainable development.	By 2001, prepare and distribute discussion paper on social issues of minerals and metals to NRCan's multi-stakeholder client base for consultation. By 2002, launch inventory of social practices by mining industries and post inventory on the Web.	*Use of leading social, environmental and economic practices in the the natural resources sector.*

Action: Provide targeted education and outreach

Issue	Approach	Target	Anticipated outcome
Providing information to Canada's future decision-makers is necessary to encourage a behavioural shift towards a culture of sustainable development.	Enhance the awareness and understanding of Canada's natural resources sector by reaching out to children and youth.	By 2002, develop and produce, in partnership with the Canadian Forestry Association and the Model Forest Program, educational material for inclusion in their annual teacher kit and distribute 65 000 copies of the Model Forest sustainable forest management posters to young people. By 2002, develop a series of natural resources outreach packages for age groups 5-9, 10-13 and 14-18. By 2002, develop a natural resources sustainable development Web site for children and youth. By 2002, make Energy in Canada 2000 available to students via SchoolNet.	*A shift in values that supports sustainable development, based on early awareness of natural resource issues and the trade-offs involved.*
Climate change is not well-understood by Canadians, yet measures to reduce greenhouse gas emissions require public awareness of contributing factors and risks.	Produce and disseminate a series of regional climate change impact posters.	By 2002, launch targeted regional climate change posters for the Prairies, Ontario, Quebec, the Atlantic region and Nunavut, and a Web site on regional climate change.	*Increased awareness of the regional impacts of climate change.*
The resource and land needs of a rapidly growing population demand well-informed decisions as to where and how we can accommodate growth. Local decision-makers have a direct role in the development of urban and rural communities. Educators, the public and municipal officials are key audiences to educate, encourage and promote positive behavioural and lifestyle changes.	Increase public awareness of the relationship and importance of geology and geological processes on the formation and evolution of local landscapes and environmental processes, building on the success of the pilot *Geoscape Vancouver*. Partners of this action include Canada-Nunavut Geoscience Office, federal departments, educators, regional and provincial/territorial agencies and interest groups.	By 2003, produce and distribute *Geoscape* posters for seven Canadian regions (Quebec City, Montreal, Ottawa, southern Saskatchewan, Calgary, Victoria and Whitehorse) and a *Geoscape* map for Canada.	*Improved land use decisions at the local and provincial level.*

1.2 Cooperation and consensus

Canada is recognized as a world leader in the production of natural resources and in those technologies, supplies and services that support natural resources development domestically and internationally. Through the application of science, technology and innovation to our natural capital, we have become first in the world in the production of potash, uranium and newsprint, second in nickel, zinc, wood pulp and softwood lumber, and third in natural gas.

The international marketplace plays a crucial role in this success. It provides a market for our natural resource products, a source of capital investment, an inspiration for technology development and exchange, and a catalyst for competitiveness and productivity. The integration of the principles of sustainable development in the mandate of Natural Resources Canada positions the Department in a leadership role in Canada as well as internationally in our sectors of expertise.

Natural resource development (exploration, extraction, production and distribution, and partnerships between the Department and the private sector), has spawned vibrant, innovative and internationally successful industries developing and exporting technologies and services in all of the sectors. For example, the Canadian geomatics industry has captured nearly 20 percent of the growing global geomatics market.

However, natural resource-related exports face a host of challenges including: increasing competition in both traditional and emerging markets brought about through the globalization of the world economy; the rapid development of new technologies; concerns about environment, health and social issues and possible repercussions for natural resource industries; the emergence of new trade barriers; and competition for investment capital.

Domestically, NRCan collaborates closely with provincial, territorial and municipal governments to achieve a common commitment to action. Internationally, NRCan contributes to fora with the Department of Foreign Affairs and International Trade by providing expert opinion on the natural resources sector. NRCan also works to share its expertise to advance sustainable development in other countries.

Two priorities have been identified under this objective: to promote sustainable development practices internationally; and, to develop national consensus on forest issues within a complex arena of multiple parties, values, jurisdictions and responsibilities.

Action: Promote Canadian sustainable development practices internationally

Issue	Approach	Target
NRCan has implemented its world-unique Fire Monitoring, Mapping and Modeling System (Fire M3) throughout Canada. This technology monitors forest fires and provides fire managers and community leaders with the right information to make million-dollar decisions that save lives and ensure Canadians are safe and secure, and that ensure our forests are well-managed for generations to come.	Canada will contribute to the safety of other communities in the world by providing a variant of Fire M3 to be implemented in Indonesia. There are also discussions on the opportunity to implement in Guatemala, Mexico and possibly other Latin American and Southeast Asian countries.	By 2001, initiate first implementation of Fire M3 in Indonesia.
An important aspect of NRCan's role in the sustainable development of minerals and metals is showcasing our environmental technologies and fostering the adoption of Canadian standards internationally.	NRCan will work with the Canadian International Development Agency (CIDA) and with experts from other government departments, academia and the private sector to transfer technology and provide input to policy and regulatory development related to the sustainable development of minerals and metals in less-developed countries. This builds on the success of the work completed for the first SDS, and contributes to Canada's international mandate	By 2001, complete a project in partnership with CIDA to build expertise in mine rehabilitation in Brazil. By 2002, complete a project in partnership with CIDA to build expertise in environmental regulation for the gold mining sector in Guyana. By 2003, complete a project in partnership with CIDA to assist with the development of improved environmental capacity within the mining sector in Zambia.

Anticipated outcome

Canada demonstrates leadership in resource safety globally by transferring state-of-the-art knowledge and technology.

Anticipated outcome

Increased capacity in environmental management practices related to the development of mineral resources in selected countries.

Issue	Approach	Target	Anticipated outcome
Industry needs to demonstrate to society that it is part of the sustainable development solution in the energy and transportation sector. The United Nations Commission on Sustainable Development will hold its 9th session (CSD 9) April 16 to 27, 2001 in New York, with one of the main themes of this session being sustainable energy and transport technologies.	NRCan is leading a Canadian initiative for an energy and technical exhibit on Energy and Transport for the Future to accompany CSD9 in cooperation with other federal departments, the private sector and members of civil society. The Exhibit is designed to highlight the successful implementation of programs and policies involving energy and transport technologies for sustainable development and draw practical and results oriented examples more closely to the intergovernmental discussions. Canadian firms and their technologies will form part of the international exhibit.	By 2001, in partnership with other government departments, host a technical exhibit at CSD 9 on Energy and Transport for the Future.	*Enable an informed international debate on energy and transport issues.* *Demonstrate existing technologies and the opportunities for their deployment, especially in developing countries.*

Action: Develop a national consensus on forest issues

Issue	Approach	Target	Anticipated outcome
Canada recognizes the importance of multiple values in the management of its forests. Consensus-building is seen as the basis for decision-making in a sustainable society. Complex jurisdictional responsibilities and roles, and the needs of communities and individuals must be respected.	A new National Forest Strategy (2003-2008) will be prepared, following consultations across Canada, with the participation of the National Forest Coalition. It will build on the success of ***National Forest Strategy*** *(1998-2003) Sustainable Forests: A Canadian Commitment.*	By 2003, develop the new National Forest Strategy. By 2003, sign new Canada Forest Accord in time for the World Forestry Congress in Québec City.	*A cooperative approach that will make sustainable forest management a reality in Canada. Canada will continue to be recognized for its forest stewardship and leadership in the area of sustainable forest management.*
The world demand for timber products is growing. Canada also enjoys primary forests for other non timber benefits. To ensure a sustainable future, there is a need to protect more primary forests by: modifying harvesting techniques and increasing the level of representative forest protected areas; growing more wood in second growth forests; increasing strategic silvicultural and regeneration actions; and, by creating a new forest fibre.	Initiate a dialogue, Forests 2020, to involve Canadians in an innovative Canada-wide approach to increase the stewardship of forests while ensuring the continued growth of the forest industry.	In 2001, NRCan, in partnership with provincial/territorial governments, will conduct a round of consultations with Canadians to seek their views on the proposal to further Canada's comprehensive sustainable forest management.	*Bring together leadership, community stability, economic development and advances in science and technology to enhance and sustain the contribution of the natural resources sector to Canadians' quality of life.* *Attract investment into potential new forestry initiatives such as high yield, fast-growing plantations.*

1.3 Policy instruments

NRCan is committed to developing and promoting a mix of economic, regulatory and voluntary approaches that further encourage the sustainable development of natural resources. For example, the Department works with other departments to assess and develop practical options for domestic emission trading in greenhouse gas emissions. NRCan is also working to integrate issues surrounding sustainable development decision-making and the choice of optimal policy instruments. The Department is promoting discussion on a more rigorous decision-making process including policy instrument choice and risk management.

NRCan will continue to work with other departments to ensure that policy instruments are developed which will promote sustainable development. Indeed, policy instruments permeate a number of actions put forward in this Strategy (e.g., resource recovery in Objective 2.1). The priority for *SDS – Now and for the Future* is to analyze options for domestic emission trading, as a crucial part of Canada's approach to the Kyoto challenge.

Action: Analyze options for domestic emission trading

Issue	Approach	Target
The development of a national emission trading program, combined with regulatory caps on greenhouse gas (GHG) emissions, has been identified as a potential vehicle to reduce the domestic economic costs of meeting Canada's Kyoto target. There remains a great deal of uncertainty on how such a program could best be designed, its impact on the Canadian economy, and its contribution to sustainable development. A National Implementation Strategy has been developed in response to the Kyoto targets.	In partnership with other departments, assess and develop practical options for a domestic GHG emission trading program. This builds on the work completed for the first SDS, and will further assess how these options would affect the economic and social adjustment costs of achieving Canada's Kyoto target.	By 2002, deliver analysis and recommendations in support of the National Implementation Strategy.

Anticipated outcome

The recommendations resulting from this analysis will address the environmental, social and economic challenges related to a GHG emission trading program and identify options that reduce the economic costs of meeting Canada's Kyoto commitments while complying with the Kyoto Protocol.

Goal 2:

To provide Canadians with sustainable economic, social and environmental benefits derived from natural resources for present and future generations

OBJECTIVES

- 2.1 Innovation and opportunity
- 2.2 Trade and markets
- 2.3 Sustainable communities

The natural resources sector is indispensable to job creation, economic growth, community development and Canadians' quality of life. To sustain the sector's capacity to provide both a healthy economy and a healthy environment – for generations to come – the natural resources sector must make the most efficient use of Canada's natural resources. A sustainable resources industry makes fewer demands on the environment, creates economic opportunities and provides greater stability to Canadian communities. It also strengthens Canada's competitiveness and opens up new markets abroad so that Canadians can continue to enjoy an exceptionally high standard of living.

We believe that the actions in support of this goal will "push the envelope," so that in three years, we can truly see this integration taking hold.

2.1 Innovation and opportunity

At its heart, innovation is a response to the demand to improve, to invent, to challenge the norms. The continuous search for new and better ways to do things has driven Canada socially and economically. NRCan's stakeholders consistently emphasize the key role that the department has to play in innovation. We acknowledge this role, and will undertake actions to advance eco-efficiency, resource recovery and innovation in resource development and address the needs of all sectors of society.

Action: Promote innovation in resource development

Issue	Approach	Target	Anticipated outcome
Eco-efficiency enables businesses to increase productivity and competitiveness while making measurable progress towards improved environmental performance. Eco-efficient practices spur innovations in technology, production and organizational processes, and product design. The implementation of eco-efficient practices and technologies could complement government efforts to make Canadian industries more innovative and productive. A detailed economic and scientific rationale for moving towards eco-efficiency is necessary to raise awareness among industry, to attract investment and to drive research initiatives.	Work with partners to establish Canada's capacity for eco-efficiency. Ensure that the proper techniques and tools are made available to enterprises in the natural resources sector to facilitate the adoption of eco-efficient practices. Partners include other government departments, private sector companies, associations, research institutes and academia.	By 2002, complete a report, including a gap analysis, which will target investment and research and development opportunities. By 2003, launch an eco-efficiency toolbox, provide high profile case studies and a develop a communication strategy to promote the adoption of eco-efficiency in industry. By 2002, build capacity in research facilities for advanced manufacturing, material design processes and the development of innovative materials and technologies. By 2001, develop an eco-efficiency and Design for Environment training package for use in product development and manufacturing in the auto parts sector.	*Decreased demand on Canada's natural resources due to decreased consumption in production processes.* *Reduced emissions from production processes.* *Eco-efficiency will enable corporate social responsibility both domestically and abroad.*

Eco-efficiency

A recent interdepartmental study, led by NRCan, *The Role of Eco-efficiency: Global Challenges and Opportunities in the 21st Century*, has confirmed that eco-efficiency is equally good for the environment and the bottom line. Large firms are utilizing tools such as Environmental Management Systems, Life Cycle Analysis, Design for Environment and Supply Chain Management to deliver competitively-priced goods and services while reducing ecological impacts and resource intensity through the life cycle.

The House of Commons Standing Committee on Industry defines the concept of eco-efficiency "as an important business practice and management tool, whereby innovations in technology, production processes, product design, and business organization and practices can lead to lower costs, improved product quality, lower environmental liability, less material usage and less adverse impact on the environment."

While many larger businesses are already enjoying the advantages of adopting eco-efficient technologies and processes, challenges remain for small and medium-sized firms that have yet to buy in to the benefits of eco-efficiency. Priority areas to advance eco-efficiency include raising awareness of the productivity gains and economic dividends of eco-efficient practices, strengthening capacity and skills, applying the tools of eco-efficiency in the marketplace and exploring further investment opportunities.

Issue	Approach	Target
Domestic and global demand for recycling and recycled products has been steadily increasing. There is now need for a coordinated approach to increase the efficiency of materials recovery and recycling across Canada, and to use Canadian expertise and technology internationally. A Canada-wide initiative to encourage increased recycling will not only have significant environmental benefits, but will benefit all levels of government, industry, research institutions and the general public, creating jobs and new partnership opportunities.	Implement a federal resource recovery strategy to identify policy drivers and inhibitors, to enhance and encourage increased recycling of resource materials in Canada, to support climate change objectives, create business opportunities and facilitate trade in recyclables. Partners include other government departments, provincial governments, municipalities along with industry.	By 2003, develop an information infrastructure to properly identify consumers of recyclable materials and to track consumption patterns of Canadian recyclable resources. By 2003, undertake research and development activities on recycling and resource recovery technologies to: identify policy drivers and inhibitors; identify areas needing infrastructure change and technology development; and support the testing and evaluation of recycling and resource recovery processes. By 2003, coordinate mechanisms for the exchange of technologies domestically and to contribute to capacity building globally. By 2003, support, develop and implement a mix of regulatory, voluntary and fiscal instruments to permit increased uptake of recycling, in conjunction with other government departments.

Anticipated outcome

Increased material recovery and conservation, energy reduction, public awareness of recycling and reduced burden on landfill.

Issue	Approach	Target	Anticipated outcome
The natural resources sector ranks among the most innovative in Canada. It has increased its productivity by adopting innovative solutions and sustainable development practices and has, as a result, held its ground against global competitors. But holding ground is not enough; if Canadian natural resource industries want to capture emerging and rapidly evolving global markets, they must develop and implement world-first innovations.	Conduct and sponsor scientific research that will enhance the competitiveness of the Canadian mining industry through development of innovative mechanization and automation technologies. Partners include mining companies, equipment manufacturers, research organizations and regulators throughout North America.	By 2003, develop and test water-powered mining equipment to replace less efficient compressed air equivalents. By 2003, elaborate innovative concepts and systems for removing ore from narrow-vein deposits. By 2003, complete demonstration projects to develop and apply hydrogen fuel cell technologies for underground hardrock mining.	*Decreased operating costs for Canadian mines leading to extended mine life with associated employment opportunities. New economic opportunities for Canadian industry through establishment of world leadership in mining technologies.*

Innovation in the Natural Resources Sector

The Government of Canada has committed to accelerate innovation in established and emerging sectors of the economy in partnership with the private sector, provinces, territories and academia. Innovation – vital to the natural resources sector in Canada – results in world class products, access to global markets, and underpins the quality of life for all Canadians.

Growth opportunities in resource-related areas are impressive. From 1996 to 2010, paper and paperboard products should grow by close to 40%; geomatics industries in Canada are growing at 20% per year; oil sands production is expected to increase by over 50% per year from 2001-04; and in the mining industry, robotics could grow by as much as 50% per year. Only by developing and implementing world-first innovations will Canadians be able to capitalize on these new opportunities.

NRCan is helping to transform Canada's natural resources industry into one of the most productive, sophisticated and environmentally-friendly in the world through its investments in science and technology, and its transfer of knowledge and expertise. A long-term vision and strategy to achieve sustainable development further support this transformation. However, to truly advance sustainable development, the integration of social, economic and environmental considerations must become second nature – not an afterthought.

Issue	Approach	Target
It is anticipated that Canada and the world will continue to utilize hydrocarbon-based fuels for the foreseeable future. A sustainable future includes energy that contributes to socio-economic growth while minimizing risks to the environment.	NRCan will provide the tools to reduce capital and operating costs and GHG emissions of producing clean, dry bitumen and heavy oil from Canada's oil sands and heavy oil resources by evaluating and developing new or improved technologies. This initiative will be pursued as part of a consolidated federal energy S&T program. International linkages include the International Energy Agency and the US Department of the Environment.	By 2001, NRCan will identify new field upgrading processes to produce pipeline-able bitumen and heavy oil to increase the contribution of oil sands and heavy oil to Canada's oil supply while reducing the associated environmental impact. By 2003, NRCan will establish new management regimes for new frontier (off- and on-shore) areas to ensure the responsible development of resources and to advance sustainable development policy in all frontier areas.
Geoscience information is fundamental to the discovery and sustainable development of new mineral and energy resources. Canada's geoscience knowledge base is also one of the country's key advantages in attracting investment in an increasingly competitive global exploration market. Much of Canada's current geoscience coverage was compiled more than 20 years ago and does not incorporate ideas, techniques and technologies of today. This contributes to the recent decline in investment by the exploration industry. Also, information that currently exists is housed in federal, provincial and territorial agencies in various formats, without national standards or coordinated access and distribution policies.	Stimulate new investment in mineral exploration through the Targeted Geoscience Initiative (TGI) by: expanding and upgrading geoscience information in targeted areas of mineral deposits potential across Canada through geological, geophysical and geochemical mapping; and, by making strategic investments to enhance the Canadian Geoscience Knowledge Network (CGKN), providing online access to Canada's integrated geoscience knowledge base as part of Government On-Line.	By 2001, release initial reports, publications, maps, database compilations from 22 Targeted Geoscience Initiative projects across Canada, in collaboration with provincial and territorial geoscience agencies. By 2002, complete years 2 and 3 of the Targeted Geoscience Initiative. By 2002, develop the Canadian Geoscience Knowledge Network geoscience data model to facilitate the discovery, mutual understanding and exchange of geoscience data.

Anticipated outcome

Reduced environmental impact of bitumen production and processing, and of offshore heavy oil and natural gas production.

Anticipated outcome

Ensure the sustainable development of Canada's mining and energy sectors through the discovery of new economic reserves of minerals, oil and natural gas.

2.2 Trade and markets

The global economy requires natural resources, in both raw and processed forms. Canada is increasingly providing more value-added products. We also export the knowledge, technology and services that are more and more in demand around the globe. Canada's contributions are two-fold: selling higher-value, more environmentally-friendly products (and thereby developing our domestic economy); and, marketing the information, skills and processes that allow other countries to move toward their own sustainable development goals. As globalization increases competitive pressures, it will be essential to not just maintain, but expand, Canada's market niche.

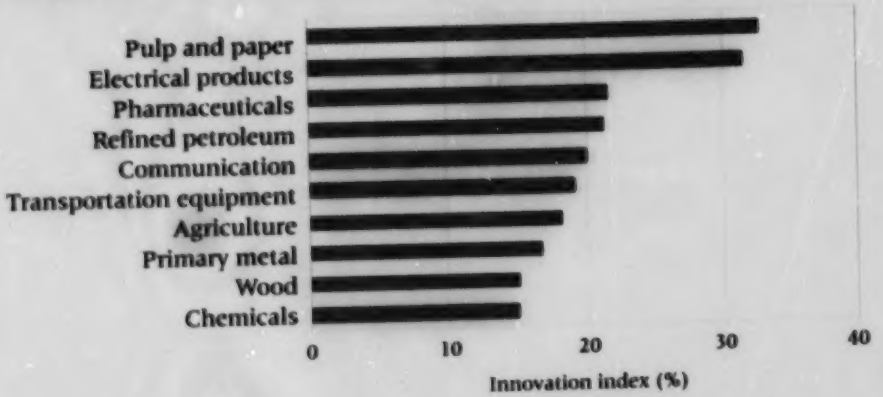
Action: Increase market access for Canadian resource-related industries

Issue	Approach	Target
Canada's resource-related industries depend on exports for their continuing success. Barriers to markets and trade are crucial issues for Canadian companies. The sector must be assured of a fair playing field internationally in order to maintain and expand markets.	Support negotiation to maintain and expand market access and encourage improvements in the business climate abroad for Canadian companies, so they can continue to contribute to Canada's prosperity. NRCan will pursue this objective in cooperation with other federal departments and the private sector.	By 2003, undertake new bilateral and multilateral engagement to address regulatory and policy initiatives and to encourage trade liberalization in the minerals and metals industry, the forest products sector, and the energy sector.

Anticipated outcome

Increased market access contributes to viability of Canadian industry and its ability to contribute to sustainable development here and abroad.

Ten Most Innovative Industries in Canada, 1993-1997



[(Machinery and equipment + R. and D.)/Value added]*100
Source: Industry Canada

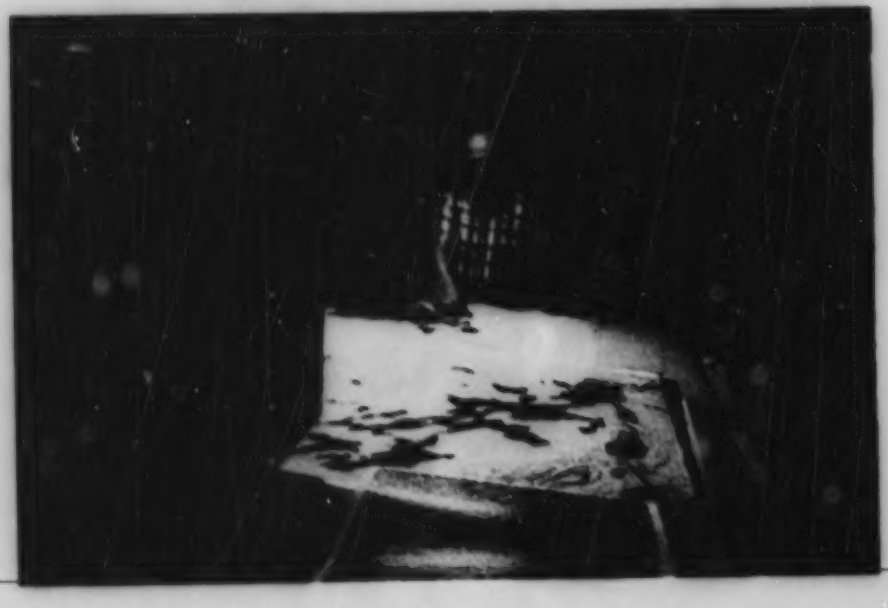
Action: Expand efforts to promote international business development

Issue	Approach	Target
Canada's resource-related industries depend on exports for their long-term viability. Globalization, technology and concerns about the environment are challenges facing Canadian resource companies competing internationally. Efforts to assist industry to expand exports will help the sector stay competitive and will contribute to employment.	NRCan will expand efforts to promote international business development, in partnership with Team Canada Inc, other government departments, provinces and the private sector.	Throughout 2001-03, continue to undertake trade missions as appropriate, and when possible, led by the Minister. By 2001, establish a specialist at the Canadian Embassy in Beijing to assist Canadian natural resource companies with business opportunities. By 2002, implement Trade and Investment Strategy. By 2002, place climate change specialists in targeted embassies to help Canadian natural resource companies pursue business opportunities in designated markets.

Anticipated outcome

The maintenance and expansion of resource- related exports in traditional and emerging markets.

Contribute to sustainable development at home and abroad through expanded export of products, services and technologies developed by the resource-related sectors.



2.3 Sustainable communities

Those most aware of, and anxious to advance, sustainable development are people whose communities are confronting complex social, environmental and economic challenges – including economic "boom-or-bust" cycles in rural and resource-reliant communities, changing demographics, and concerns over environmental degradation.

Citizens consulted by NRCan have expressed their desire to be part of the solution. They want to participate openly in decision-making that will, ultimately, impact their quality of life. They expect governments to provide seamless access to the various programs and services they require to make the right choices. A consistent message heard at citizens' forums is the importance of engaging the community in the process of determining their needs and values, and in developing, defining and ranking their own indicators of community sustainability.

Government departments are rethinking traditional roles in support of community development. Sustainable community development brings the instruments of government (policies, programs, services and regulations) into alignment with the needs of, and challenges facing, communities. It must address people's social, cultural, and environmental priorities and concerns as well as economic ones. The principal challenge is to increase the potential success of integrated, community-based approaches that render sustainable economic, social and environmental benefits while fostering greater community interdependence, empowerment and viability.

NRCan recognizes that strong communities are a key contributor to the quality of life of Canadians. The Department is actively engaged in fostering sustainable communities through initiatives aimed at:

- **fostering community leadership and capacity-building**
- **supporting skills and learning**
- **ensuring access to knowledge and tools for decisions**
- **engaging in partnerships for community development**

Priority Areas for Sustainable Community Initiatives

Sustainable Communities Initiative – provides remote, rural, northern and Aboriginal communities with internet access to data and analytical tools for decision-making

Aboriginal Participation in the Resource-Based Economy – increases Aboriginal participation in and benefits from the resource-based economy through partnerships and capacity building.

Energy Efficiency, Renewable Energy & Community Energy Systems – emphasizes working with communities to increase awareness of options available to meet future energy needs

Green Municipal Infrastructure – encourages advances in environmental technology & innovation

Environmental Management Systems – commits the Department to sustainable development by keeping our own house in order.

Action: Develop and disseminate information for community capacity

Issue	Approach	Target
Aboriginal, northern, rural and coastal communities require information and skills to improve their ability to plan, make decisions, and create partnerships. The Sustainable Communities Initiative, launched as a pilot in 1997, provides key information to these communities via the Internet – natural resources, environmental, and non-confidential social and economic data – at the community, regional, and national scales. Building sustainable communities requires partnerships among government, industry and communities.	Expand the Sustainable Communities Initiative to reach more communities. Improve access to information sources and information processing methods, enable improved communication and consultation, and promote partnerships. Partners include federal departments, industry, Aboriginal organizations, non-government organizations, and provincial governments	By 2003, implement Sustainable Communities Initiative in 60 communities.
A number of federal departments have programs that are specifically for the North, a sparsely populated area that covers more than 40% of the country. Some departments with major northern programs have a regional presence, but many service the North from other parts of the country or on an ad hoc basis. A common federal vision for the North is required, given the diverse mandates of federal departments.	Contribute to the development of a Federal Northern Sustainable Development Strategy.	By 2001, in partnership with other government departments, participate in the development of an action plan as part of a Federal Northern Sustainable Development Strategy.

Anticipated outcome

Enable Aboriginal, rural, coastal and northern communities to be in better control of their future, to seek and seize opportunities and address environmental, social and economic pressures, through improved planning, consultation and use of Internet and mapping technologies.

Anticipated outcome

A North where collective decision-making processes, recognition of land claims settlements and excellence in resource management are achieved through policies and programs that will serve as models both domestically and internationally.

Action: Build Aboriginal and community capacity to practice sustainable natural resources management

Issue	Approach	Target
Aboriginal people see the forest as vital to both their traditional way of life and their economic future. Further to the success of the First Nation Forestry Program, NRCan has been studying approaches to extend similar methodology and principles for the participation of Métis and off-reserve Aboriginal communities in the sustainable forest management economy. The Model Forest Program enabled forests to become living laboratories where people with a direct interest in the forest, supported by the most up-to-date science and technology, could participate in decisions about how the forest could be sustainably managed.	NRCan will undertake further policy research and pilot projects for the Métis and off-reserve Aboriginal people. Transfer the know-how, skills and methodologies developed by and within the model forests, and apply in forest operations and in resource-based communities, to share locally-driven solutions for the sustainability of forest-based regions and communities.	By 2001, launch renewed First Nations Forestry Program. By 2001, conduct four pilot projects to assess the potential of Métis and off-reserve Aboriginal participation in forest-based economy on a regional basis. By 2001, host a series of six outreach workshops across the country to share the model forest experience with local level indicators. By 2002, launch renewed Model Forest Program.
Many Aboriginal communities are not adequately prepared to take full advantage of minerals and metals-related opportunities. Capacities, skills, knowledge and experience can be built through partnerships to assist in accessing these opportunities.	NRCan will work in partnership with the mineral industries, governments and Aboriginal communities to implement activities that support Aboriginal peoples and communities, such as producing a series of maps of Aboriginal communities near mineral and metal development activities; encouraging the development of key stakeholder working groups and other initiatives that flow from building relationships between Aboriginal communities and the industry; and exploring possible activities and initiatives that build capacities of Aboriginal communities related to mineral and metal activities.	By 2001, initiate a multi-stakeholder working group and begin discussion towards an Aboriginal minerals and metal partnering initiative. By 2001, launch the Aboriginal communities near minerals and metals map series to the public.

Anticipated outcome

Aboriginal and rural communities with increased capacity to sustainably manage forest-based resources, adapted to specific regional/local circumstances and values.

Anticipated outcome

Increased dialogue among Aboriginal communities, industry and governments; a solid foundation for contributing to building capacity, knowledge, skills and expertise of Aboriginal peoples about the mining industry; and, increased awareness and mutual understanding between Aboriginal communities and the mining industry.

Issue	Approach	Target	Anticipated outcome
NRCan has the legislated responsibility to regulate all legal surveys on Canada Lands. Canada Lands include Indian Reserves, national and historical parks, the Territories, Canada's off-shore area and other Aboriginal lands. Legal or cadastral surveys delineate the boundaries that define the extent of ownership interests in land. Plans of legal surveys are used in legal documents that transfer these interests. Land and resource management functions are being transferred to Aboriginal people at a rapid pace. Consequently, these groups need to develop the skills they need to manage their land and resources. The foundation for the sustainable development of land resources is a stable, robust and effective property rights infrastructure. NRCan has well-established working relationships with many Aboriginal communities that enables it to work with these communities to identify and develop the skills they need for property rights management.	Establish an effective and efficient property rights infrastructure for First Nations and Aboriginal groups under the Canada Lands Survey System. The Blood Tribe of southern Alberta has the largest population of all First Nations in Canada. Partners include various federal, provincial and territorial government departments, Aboriginal businesses, Aboriginal groups, and various colleges and universities.	By 2001, transfer geomatics knowledge and build capacity for the Blood Tribe to improve land and resource management. By 2001, complete a study on the social and economic impacts of having a land survey and registry system, two elements of a property rights infrastructure. By 2001, complete an issue paper on *Property Rights Infrastructure* as part of an information package for Federal Land Claims Negotiators. By 2002, develop a strategy to acquire additional funds for an ongoing geomatics knowledge transfer and capacity building to other First Nations communities.	*Flexible and reliable property rights infrastructure to support the sustainable development of Aboriginal communities for current and future generations.*
Aboriginal community capacity building, including governance, for sustainable natural resources management, has emerged as a priority for both a majority of Aboriginal communities and Canada's natural resource industries. The challenge is to accelerate the adoption of community-based approaches that render sustainable economic, social and environmental benefits while fostering greater community self-sufficiency, viability and empowerment.	Facilitate the development of Aboriginal capacity for land and resource management and related economic opportunities, and promote integrated knowledge-based decision making.	By 2003, launch a strategic package of initiatives to increase Aboriginal participation in, and benefits from, the resource-based economy, in partnership with other government departments.	**Anticipated outcome** *Build partnerships for sustainable development of natural resources, enhance the knowledge base, and build S&T capacity in order to develop self-reliant Aboriginal communities.*

Action: Enable communities to determine their energy future

Issue	Approach	Target
Energy in northern and remote communities (many of which are Aboriginal and rural) is often much more expensive than in other Canadian communities, and is a major community expense. Communities can benefit from knowing the options available to them to develop and use energy wisely. Communities that identify their future energy needs and options well in advance will have more flexibility in planning paths that best suit their needs.	Develop a comprehensive approach to provide communities (leaders and energy engineers/ technicians) with information necessary for them to understand and plan their future energy requirements and the viable renewable energy and energy efficiency options available to meet those needs. This will build upon the Renewable energy project analysis tool (RETScreen) to facilitate broader option identification and assessment (i.e., including energy efficiency processes and systems tools). The approach will provide information to enable communities to identify relevant social, environmental and economic benefits/ costs associated with each option. Communities will be able to decide for themselves which option (or mix of options) reflects their needs. Partners include the Department of Indian Affairs and Northern Development, Human Resources Development Canada, the Federation of Canadian Municipalities and communities.	By 2001, develop a comprehensive, integrated energy systems approach that encompasses renewable energy and energy efficiency technologies and management practices/systems.

Anticipated outcome

Through the use of local energy resources and using energy more efficiently in northern and remote communities, keep money in the local economy, create local employment, and develop the community skills base through training and employment.

Action: Build infrastructure for sustainable communities

Issue	Approach	Target
As aging municipal infrastructure deteriorates, there is an opportunity to rebuild with innovative, environmentally-friendly technology that advances sustainable development through urban infrastructure renewal.	The department is co-governing the Green Municipal Fund with Environment Canada, Transport Canada and the Federation of Canadian Municipalities to encourage advances in environmental technology and innovation in municipal operations. Projects approved under these funds must demonstrate the highest quality and highest levels of innovation. They will serve as a living laboratory and will provide data and analysis to share with communities across the country.	By 2003, approve projects that have demonstrated environmental or energy improvements of 35% – 50%.

Anticipated outcome

Through state-of-the-art technology and research, improve the quality of citizens' lives in their communities and protect the environment.

Foster more interdisciplinary and collaborative research in areas of national importance and develop new skill sets to help Canada advance sustainable development.

Accelerate the transfer of know-how and technology throughout communities.

Goal 3: To provide Canadians with strategies that reduce environmental impacts in the natural resources sector

OBJECTIVES

- 3.1 Limit and adapt to climate change
- 3.2 Reduce environmental impacts
- 3.3 Safeguard the environment

The environment is continually fluctuating – sometimes as a result of natural processes, sometimes due to human activity. We know the environment can adjust to human and natural stresses, provided they remain within the resource's ability to adapt and renew itself; however, current scientific evidence suggests that this is not happening. Suspected links between climate change and energy use underscore the need to develop natural resources in ways that respect and protect the integrity of natural ecosystems. For a country as energy-dependent as Canada, this is a significant challenge.

NRCan has a central role in designing Canada's response options for climate change, which are integral to both the federal government's strategy and to the transformation of Canada's energy economy. The Minister of Natural Resources has been assigned the domestic leadership role in implementing Canada's response to its Kyoto climate change commitments. Efforts to promote science and technology and environmentally friendly stewardship practices are a core function of NRCan.

The next few years are critical to respond to the Kyoto challenge – indeed, addressing climate change is one of the greatest environmental and economic challenges ever undertaken by Canada.

3.1 Limit and adapt to climate change

NRCan has been called upon to develop and deliver much of the government's domestic response to Canada's climate change commitments made in Kyoto. Achieving the targeted emissions reduction will require considerable commitment on the part of consumers, industry as energy producers and users, and by federal, provincial, territorial and municipal governments. To address this challenge, NRCan has identified key strategic initiatives that will reduce greenhouse gas emissions in key sectors, and provide the science and technology that supports the development of solutions to the Kyoto challenge. A longer term view – beyond the three year period of the strategy – is essential to address this significant challenge, and as such, the first action under this objective, proposes targets that address a five-year plan of action.

Action: Reduce GHG emissions

Issue	Approach	Target	Anticipated outcome
A longer-term, national implementation strategy addressing the climate change challenge is required to put Canada on a path to achieving its Kyoto Protocol greenhouse gas emissions reduction target. The *Government of Canada Action Plan 2000* on Climate Change is the federal government's contribution to Canada's *First National Climate Change Business Plan*. Action Plan 2000 targets key sectors. NRCan is the lead department or co-lead on a significant number of the emissions reductions measures included in Action Plan 2000. The expansion and promotion of new and existing technologies is key to reducing greenhouse gas emissions now and in the future. Technological innovation is an integral component of Action Plan 2000. Action Plan 2000 will expand climate monitoring and enhance our understanding of how climate change will affect Canada. It will also help various sectors develop adaptation strategies to deal with a changing climate.	*Action Plan 2000* will invest $500 million over five years on specific actions to reduce greenhouse gas emissions. It also promotes partnerships and cost-sharing with the provinces and territories. Action Plan 2000 will: Shift consumer behaviour while working to ensure that emerging technologies, cost-effective transportation and cleaner fuels will play an important role in reducing emissions over the longer term. Enhance opportunities for capture and storage of CO_2. Expand the use of low or non-emitting energy sources by four times current levels. Encourage the implementation of energy efficiency and GHG reduction measures by: expanding the Canadian Industry Program for Energy Conservation; bench marking industrial emissions reduction performance; improving awareness of alternative technologies and encouraging appropriate capital investment; generating improvements in energy efficiency of both new and existing buildings, appliances and equipment; developing and promoting best practices that increase greenhouse gas reductions or sink potential; supporting Canadian exporters of "climate friendly" technologies; undertaking technology transfer and sustainable development issues in developing countries.	By 2001, complete discussions with provincial and territorial governments on areas of mutual interest, cost-sharing and joint action. By 2003, fully implement Action Plan 2000, to take Canada one third of the way to achieving its target established in the Kyoto Protocol.	*Through Action Plan 2000, deliver an estimated reduction of greenhouse gas emissions of approximately 65 megatonnes per year in the 2008-2012 commitment period.* *Direct benefits include the environmental benefit of cleaner air and the economic benefits of investment, cost savings from energy efficiency and expansion of renewable energy technologies.* *Indirect health benefits to Canadians from cleaner air and water.* *The Canadian economy will be more innovative and competitive.*

Issue	Approach	Target	Anticipated outcome
Seventeen percent of secondary energy consumption in Canada comes from heating, cooling, lighting and operating Canadian dwellings. Significant energy improvements can be made during the construction of new houses or the renovation of existing buildings. Commercial buildings also account for approximately 12 percent of secondary energy use in Canada.	NRCan will reduce GHG emissions by increasing end-use energy efficiency through program development and delivery.	By 2002, increase follow-up rate for house energy use evaluations by 20 per cent and increase energy efficiency in those homes by 20 per cent. By 2003, Expand Energy Innovators Plus program to have 50 more pilot projects to demonstrate energy savings from retrofits. By 2003, develop guidelines, design tools and standards to allow residential and commercial Heating, Ventilating and Air Conditioning to use advanced generation and low energy systems.	*Reduced GHG emissions from residential and commercial sources.* *Increased awareness among Canadians of residential and commercial energy use.*

Issue	Approach	Target	Anticipated outcome
The transportation sector is responsible for 35% of Canada's GHG emissions. Reducing these emissions in support of Canada's Kyoto target will be difficult, as demand for end-use energy in this sector is anticipated to grow. Canada has an opportunity to demonstrate leadership and serve as a model of sustainable development by continuing to develop and share innovative technology.	NRCan will develop technologies and strengthen the knowledge base for the production of bio-energy, develop new fuel cells, electric and hybrid vehicle technologies, prototype power-sources, control systems, auxiliaries and drive-line technologies.	By 2001, achieve 40% improvement in efficiency and emissions through better hybrid vehicle controls. By 2003, 50% weight and 25-35% cost reductions in small-scale fuel cell systems for portable and other applications, and 10-15% weight reduction in vehicular fuel cell systems.	*Greater reliance on electric and hybrid vehicles to decrease energy consumption and emissions.*
	NRCan will develop lightweight, high performance materials and manufacturing processes for fuel efficient vehicles.	By 2002, establish alloying and processing conditions for production of high strength steel for automotive applications. By 2003, develop gas sensors and actuators for enhancing energy efficiency and reduced emissions. By 2003, develop aluminum casting technology for the automotive industry.	*Increased use of specialized materials and new processes by producers of parts and components for the transportation sector, reducing energy consumption and emissions.*
	NRCan will develop lower cost water hydrolysis technologies for hydrogen production at centralized-fueling and residential scales, and new hydrogen storage technologies.	By 2001, develop computer simulation of accidental hydrogen release By 2002, develop prototype of 1 kW small integrated power system. By 2002, complete field testing of residential-scale fuel appliance.	
	NRCan will work with the provinces to educate drivers about fuel efficiency. Partners include other government departments, industry associations, private sector companies and academia.	By 2002, develop new driver examiners' curriculum to include fuel efficiency awareness, in partnership with provinces. By 2002, incorporate fuel efficiency training modules into driver education programs for new driver educaters and truck drivers to reach 60% of new driver educaters and 45% of all truck drivers.	*Drivers have an increased awareness of fuel efficiency and GHG emissions.*

Issue	Approach	Target	Anticipated outcome
The production of one tonne of cement, the major ingredient in concrete, releases about one tonne of carbon dioxide making a significant contribution to GHG emissions. These emissions can be reduced globally through the use of supplementary cementing materials to replace Portland cement in concrete. Canada has an opportunity to serve as a model of sustainable development by continuing to lead and share knowledge about new cementing materials which maintain or even improve the quality of the concrete.	NRCan will research, develop and promote the use of energy-efficient and environmentally friendly materials and technologies. Partners include CIDA, Technology Early Action Measures (TEAM), industry associations, the consulting industry, municipalities, and academia.	By 2003, resolve technical issues and develop engineering data for new/existing materials and technology associated with the use of supplementary cementing materials to replace Portland cement in concrete. By 2003, complete demonstration projects in India on the use of high volume fly ash concrete for housing and highway applications.	*Increased use of supplementary cementing materials (and resulting reductions of GHG emissions) by engineers, contractors, architects and consultants in the construction and related industries both in Canada and abroad.*

Action: Undertake science to understand climate change

Issue	Approach	Target	Anticipated outcome
The response to Canada's climate change commitments includes researching potential impacts and developing adaptation strategies as well as mitigating greenhouse gas emissions because, even if fully implemented the Kyoto Protocol will only slow – not stop – climate change and thus we will need to adapt.	Study various landscape environments in Canada, (including coastal and inland permafrost terrain, landslide hazards in the Cordillera, dune regions of the Prairies, and flood susceptible regions of Manitoba and Quebec) to improve understanding of the sensitivity of terrain stability to changes in climate.	By 2002, develop reports, databases and Web sites to communicate the impacts of climate change on various landscape types.	*Enhance partnerships for future work on climate change, improve the understanding of the impacts of climate change on climate sensitive landscapes, and contribute to the development of sustainable strategies to adapt to climate change.*
Researching geological responses to past climate and current climate variability will refine scientists' understanding of what might happen in the future. It will help land use planners, governments, industry and geotechnical engineers to decide how best to change their practices to adapt to a changing climate.	Conduct a series of case studies to assess communities sensitivity to climate change. Partners include the Federation of Canadian Municipalities and individual communities, other federal departments, provincial and territorial agencies, academic institutions and private industry.	By 2001, deliver reports specific to five communities describing the sensitivities to climate change and the tools and information needed to develop adaptation strategies, including communication and outreach materials.	*Improve local knowledge of climate change at the community level.* *Contribute to the development of resilient communities in the face of climate change, and improve adaptation research methodology for future community work.*

3.2 Reduce environmental impacts

Our future as a prosperous, healthy and sustainable society depends on the wise use and protection of our wealth of natural resources. Resource development must remain within the capacity of natural ecosystems to respond to, and recover from, human disturbance. To achieve this objective, we must prevent problems before they arise rather than attempting to undo damage already done. This necessitates measures to avoid or minimize the creation of waste and pollution as well as efforts to make more efficient use of natural resources. This, in turn, demands that we use processes, practices, materials, products and/or energy that reduce the overall risk to human health and the environment. NRCan's scientific, technical and policy expertise develops technologies and promotes practices that minimize impacts on the environment.

Under this objective, NRCan will focus its efforts on: science and technology to reduce environmental impacts; partnerships to promote biodiversity; and, research and development for a diversified energy base.

Action: Undertake science and technology to reduce environmental impacts

Issue	Approach	Target	Anticipated outcome
Current renewable energy technologies have high production costs. They also lack the infrastructure of codes, standards and training tools needed in system selection, installation and operation and maintenance. Additional constraints include low electricity buy-back rates, surplus capacity and lack of familiarity with the reliability and performance of renewable energy systems. Kyoto targets are accelerating the emergence of a global market for renewable energy technologies and services. This creates business opportunities for Canadian companies that have the best technologies at competitive prices.	In partnership with industry, develop wind energy technologies, small hydro technologies, technologies to convert biomass into electricity, photovoltaic technologies and supporting infrastructure.	By 2002, increase wind energy conversion efficiency by 10% and small hydro turbine efficiency by 5%. By 2002, Develop three new software tools that will reduce testing and evaluation costs by 5%. By 2002, develop three Internet-based tools using GIS for assessing small hydro potential. By 2002, increase efficiency of biomass conversion systems by 5%. By 2002, develop technical guidelines for the interconnection of small power sources. By 2003, reduce manufacturing and delivery costs of wind turbine blades and control systems by 10%.	*Increased use of clean, renewable energy.* *Reduce GHG emissions.*

Issue	Approach	Target	Anticipated outcome
Long-term, environmentally sound, cost-effective solutions for mine closures, including the disposal of mine waste, are among the greatest challenges facing the mining industry in Canada.	Conduct scientific research on the options and solutions to environmental challenges facing the mining industry for the closure of both active and inactive mines. Partners include industry associations, private sector companies, other federal government departments, provincial and territorial governments and academia.	By 2002, provide data which will assist in making informed decisions regarding undersea disposal of mine tailings by assessing the long term environmental and ecotoxicological consequences of marine tailings deposition at two inactive mine sites in Newfoundland. By 2002, implement a new post-Mine Environment Neutral Drainage (MEND) program which will address the priority mine closure issues identified through an extensive stakeholder consultation process. By 2003, provide data which will assist in making informed decisions on sludge disposal options.	*Improved protocols for mine decommissioning and rehabilitation resulting in reduced environmental impacts.*
Existing pipelines in Canada represent an approximate investment of $100 billion. As Canada's oil and gas pipeline infrastructure is aging, it brings greater challenges to the ongoing management of pipeline integrity and reliability. Technical information is required by the industry to prevent corrosion and to establish effective and efficient repair strategies. Information is also needed by industry, governments and agencies to better monitor the condition of pipeline systems in order to detect problem areas before they result in failures. Canada's investment in pipelines is expected to grow by 10% over the next few years. This presents a need to develop and deploy decision support tools which will assist the industry in making these investments.	Develop and transfer science and technologies which, when implemented, will prevent, detect and mitigate corrosion and environmentally assisted cracking problems in pipelines. Partners include industry associations, companies, standards associations and regulatory authorities.	By 2002, expand current scientific knowledge base in order to develop techniques for mitigating/preventing stress corrosion cracking. By 2003, evaluate laboratory methodologies for predicting long-term performance of pipeline coatings. By 2003, develop standardized methodologies for screening corrosion inhibitors for pipelines. By 2003, expand current scientific knowledge base in order to develop smart sensors for detecting pipeline failures.	**Anticipated outcome** *Enhanced capability for the ongoing management of pipeline integrity resulting in reduced releases to the environment.*

Issue	Approach	Target	Anticipated outcome
Forest management has evolved away from an exclusive focus on the sustained production of timber products. Management methods that are ecologically based, adaptive, and inclusive of multiple forest values are also social and legislative priorities. Successful adoption of these methods requires an enhanced understanding of how forests work and how forest management activities affect the ecological integrity of forest systems.	Conduct and lead research that increases Canadian capacity to transfer information and knowledge. Strengthen Canada's capacity to directly measure and report on the conservation of biodiversity and forest sustainability, to help Canadian forest sector industries improve their environmental performance and permit better access of Canadian forest products to international markets. Identify adaptation and mitigation options for Canadian forests as a response to climate change. Support developments in forest bioenergy development and fossil fuel alternatives. Partners include federal departments, provincial/ territorial governments, industry, the public, Aboriginal people, academia, international agencies.	From 2000 to 2003, catalogue and monitor local indicators for non-timber forest uses. By 2002, develop prediction model of how societal values change over time in resource-dependent, mixed, and retirement/ vacation communities. By 2002, develop models and tools for predicting long-term effects of harvesting regimes in Canada's forests. By 2002, develop proof of concept of engineering forest trees for resistance to fungal and insect pests. By 2003, complete study on the impacts of climate change on biodiversity. By 2003, develop models of local and regional socio-economic impacts of climate change.	*Tools and approaches to enhance timber production.* *Synthesis and integration of knowledge and provision of systems to enhance decision-making capacities.* *Scientific support for climate change, international forest health and policy issues, Canadian forest biodiversity issues, the development of criteria and indicators of sustainable forest management.* *Conservation and protection of forest ecosystems.*

Action: Develop partnerships to promote biodiversity

Issue	Approach	Target
Voluntary conservation of species and habitats by resource industries can complement proposed species at risk legislation and make important contributions to protecting Canada's natural heritage and to ensure a sustainable future. Natural resource industry associations and companies, national conservation organizations, and rural, remote and Aboriginal communities can have a positive impact by undertaking voluntary measures.	Develop partnerships, through the Biodiversity Stewardship in Resource Industries Initiative, between the resource industries and conservation organizations to undertake non-regulatory initiatives to conserve biodiversity. This initiative can make a significant contribution to the Government of Canada's environmental agenda as well as implementation of environmental principles by industry. Partners in this initiative include natural resource industry associations and companies, national conservation organizations, rural, remote and Aboriginal communities and other federal departments. Other potential partners include agricultural and fisheries associations.	By 2001, seek consensus on program implementation By 2001, broker industry-conservation-Aboriginal participation in stewardship programs By 2001, facilitate a multi-sector, on-the-ground, landscape-scale pilot stewardship action plan.

Anticipated outcome

Demonstrate that voluntary stewardship partnerships can lead to conservation initiatives that address the needs of Canada's species at risk and effectively sustain the biodiversity.

Demonstrate sound alternatives to regulatory approaches to protecting species.

Conserve biodiversity and ecological systems for future generations, contributing to knowledge generation and information exchange about wildlife and habitats, developing meaningful multi-stakeholder partnerships to ensure that decisions are integrated and responsibilities shared.

Action: Research and development in support of a diversified energy base

Issue	Approach	Target	Anticipated outcome
Canada has supported the development and deployment of nuclear technologies for over fifty years. Nuclear technologies and materials are used daily across a broad spectrum of industrial, agricultural and medical applications. Nuclear energy generates a series of public confidence concerns in relation to safety and security. However, it does not produce the atmospheric emissions of conventional forms of energy. Nuclear energy currently supplies between 15 and 20 per cent of Canada's electricity requirements. Nuclear power energy presents alternatives that can contribute to sustainable energy development and at the same time reduce greenhouse gas emissions. If Canada is to support and maintain a domestic and international nuclear energy option, there is a need to support research and development of future nuclear technologies. Current research facilities are in need of refurbishment and rationalization.	Establish the legislative and regulatory framework to ensure safe and responsible management of the nuclear energy option in Canada. Continue to support nuclear R&D with a view to ensuring that R&D efforts continue to support public policy objectives; this will entail modernizing, retrofitting and rationalizing Canada's nuclear R&D facilities and making the necessary decisions pertaining to any new facilities required to better serve public policy goals in the nuclear field. Enhance public information and communications by federal departments and agencies involved in Canada's nuclear program as well as international organizations such as Nuclear Energy Association and International Atomic Energy Agency. The new modernized Nuclear Safety and Control Act and Regulations are now in effect. Work is underway to revise Canada's Nuclear Liability Act; according to current planning goals, the new legislation is expected to be established by early 2002. Nuclear Fuel Waste legislation is expected to be in place by the end of 2001.	By 2001, develop a Canada-Saskatchewan MOA on the clean-up of abandoned uranium mine and mill tailings. By 2003, complete a series of decisions relating to the rationalization, refurbishment and modernization of AECL's nuclear research laboratories, including the closure of Whiteshell Laboratories and the privatization of AECL's Waste Technology Business Unit and Underground Research Laboratory (URL). It is also anticipated that a decision regarding the replacement of the NRU research reactor will be made in the 2001-2002 time-frame. By 2001, provide a current and comprehensive Web-based package of information on nuclear energy and related issues.	*Responsible and safe management of the nuclear option to ensure that health and safety of Canadians remains paramount in Canada's nuclear energy program.* *Course set in Canada to move effectively towards implementing an approach for the long-term management of nuclear fuel waste in which the public has confidence.* *Federal-provincial agreements for sharing the costs of decommissioning all abandoned uranium mines and mill tailing sites in Canada (a Canada-Ontario agreement was established in 1996)* *Effective and efficient nuclear R&D programs in support of the nuclear sciences and the safety and performance of Canada's nuclear energy program* *Enhanced understanding by the public of the nuclear energy option and of the Government's role.*

3.3 Safeguarding the environment

Risk assessment requires a knowledge of the nature of the hazard, plus the likelihood of exposure. NRCan's contributions to risk assessment associated with Canada's natural resources, the terrains in which they are found and the processes involved in their development lie in fully understanding the nature of the hazard and making reliable information available to organizations responsible for risk assessment and risk management decisions.

Action: Undertake science for risk assessment and policy making

Issue	Approach	Target	Anticipated outcome
Government and industry require geoscience knowledge to develop national and international policies concerning metals and their release into the environment, and to formulate regulations for Canada. Through this initiative, NRCan will help risk assessors and policy makers make appropriate decisions regarding the monitoring and control of toxic forms of certain metals.	Provide science for risk assessment and risk management through studies on transformation, sources and sinks of metals on the environment and human health.	By 2002, publish research projects to address: the validity of historical records of metal accumulation in sediments and biota; the transportation of mercury to bioavailable forms; the modelling of metals deposition around the Rouyn-Noranda smelter. By 2002, publish comprehensive results of the 5-year Metals in the Environment (MITE) initiative.	*Contribute to risk assessments undertaken by responsible agencies that permit NRCan to properly evaluate environmental assessments submitted for review. The knowledge will contribute to the development of effective risk management options by responsible agencies.*
Understanding how metals released by anthropogenic activities behave and mobilize in the environment is important to the metal mining industry, the scientific community and policy makers. Sound science is key to furthering this understanding so that stakeholders can agree on what compounds need to be managed to protect the environment and what approaches should be taken.	Conduct scientific research on the behaviour/effects of metals released to the environment. This builds on the work done for the first SDS on developing internationally recognized protocols for the classification of risks posed by heavy metals. Partners include scientific societies, academia, other government departments and industry associations.	By 2003, complete research to extend to alloys the application of the draft transformation protocol developed for the OECD hazard classification of metals. By 2003, provide an approved methodology for alternative criteria to Persistence, Bioaccumulation for hazard assessment and classification of metals. By 2003, develop an improved life-cycle assessment (LCA) model which is applicable to metals.	*Contribute a sound scientific base for the development of environmental policy and regulation.*

Issue	Approach	Target	Anticipated outcome
Developing natural resources in the north has unique risks, due to the harsh climate, and given the potential for significant environmental impacts as the result of an accident. The seafloor and coastline which are used as a foundation for pipelines and hydrocarbon production structures present significant challenges as the stability of the seabed and coastline are not well understood.	Develop recommendations as to the risk to pipeline and production failures due to instability of the sea floor and coastline, and damage by ice keels. Produce and distribute reports to native groups, regulatory agencies such as the National Energy Board, the Department of Indian Affairs and Northern Development, the oil industry and private consultants outlining seabed risks to pipeline and production structure development in the Arctic offshore and coastal zone. Develop recommendations as to minimizing risks to marine wildlife and coastline due to the failure of pipelines and production structures. This will be undertaken in conjunction with the Department of Fisheries and Oceans, Environment Canada and Native Groups.	By 2003 produce reports which outline the origin of subsea permafrost, and define the effects of ice scour on the sea bed and the erosion rate of the coastline. By 2003, produce reports on the distribution of extreme ice scour depths to constrain pipeline burial depths and distribution of subsea permafrost to constrain production structure design and regulation, and processes controlling coastal instability.	*Ensure that industry places pipes and production structures at the proper depth and location, while minimizing risk to the environment.* *Ensure continued development of Canada's northern resources for the social and economic benefit of local communities.*

Goal 4: To provide Canadians with safety and security in the natural resources sector

OBJECTIVES

- 4.1 Safeguard Canadians
- 4.2 Spatial positioning, mapping and boundary maintenance
- 4.3 Safe use of explosives and pyrotechnics
- 4.4 Enhance safety and security in the workforce

People are central to the sustainable development equation. Progressive societies that are pursuing sustainable development need to be confident that programs are in place to ensure public safety and security. Government's role in this process is to instill confidence in people and communities that the public good is paramount. It is in this sense that NRCan has a role to play in advancing this Goal.

NRCan provides many products and services that support the institutions of public governance as part of a strong economic and social fabric. Its contributions include science and technology, legislation, regulations, codes and standards which reduce the health and safety risks associated with disasters and the development of resources.

Risks can range from direct on-the-job extraction activities, to ensuring that disasters can be dealt with in a timely manner, to identifying potential hazards that may arise from future access to resources. We must be confident that our interactions with natural resources do not put Canadians at risk.

4.1 Safeguard Canadians

NRCan works to ensure that Canadians are safe from the risks associated with natural resource development and use. Through research, science and technology, we may mitigate or eliminate risks. Risk assessment – the evaluation of the probability and magnitude of adverse effects from climate, earthquakes and landslides, fire and flood – enables NRCan to further safeguard the safety of Canadians. NRCan also undertakes risk management, which involves deciding how to prepare against possible dangers and what actions to take.

Technological advancements are the core of *SDS – Now and for the Future*; new concepts, technologies and information dissemination methods are enabling NRCan to provide hazard information more reliably and quickly.

Action: Monitor and address natural hazards and disasters

Issue	Approach	Target	Anticipated outcome
The earth and its processes pose a variety of hazards to human safety and infrastructure. NRCan has had an active program to monitor, understand and provide advice on such phenomena, including earthquakes, landslides, magnetic storms, volcanic eruptions, permafrost instability and explosive gas hydrates. New technologies, concepts and information dissemination methods will permit NRCan to provide hazard information more reliably and more quickly to mitigate the potential consequences to human safety and damage to buildings and service infrastructure. NRCan is called upon to quickly provide maps and information needed by emergency teams responding to disasters. Many current paper maps of Canada are outdated, making them less relevant to rescuers. As well, clients increasingly require digital maps, data and on-line access, in addition to paper maps.	NRCan will increase Canadians' capacity to predict, monitor, report and cope with natural hazards and disasters, and to mitigate their deleterious effects.	By 2002, publish new seismic hazard maps and hazard information for Canada and make data available on-line. By 2002, make client-tailored, online, magnetic forecasts routinely available. By 2002, publish the national landslide database, hazard map and synthesis of landslide hazard. By 2003, complete topographic mapping (including digital coverage) at scales suitable for resource exploration and development in the North. Through 2001, generate Internet-accessible fire reports, maps and tables as provided by the Canadian Wildland Fire Information System and the Fire Monitoring, Mapping and Modeling System (Fire M3), on a daily basis.	*Reduce social, economic and environmental losses due to natural hazards, to provide reassurance to Canadians.* *A clearer, more up-to-date picture of fire activity in Canada, to permit better fire suppression resource deployment decisions, saving money and time.*

4.2 Spatial positioning, mapping and boundary maintenance

Canada's national spatial reference system has served as the foundation for surveys and mapping and is now extending to a multitude of disciplines involved in developing physical and spatially-related information infrastructures that use new technologies. Under *SDS – Now and for the Future*, access to this system will be improved, spawning direct economic benefits by providing a national standard to facilitate the sharing and integration of spatially-referenced data, as well as enabling operational efficiencies and new applications such as intelligent transportation and precision farming that support sustainable development.

Action: Improve Canada's spatial reference infrastructure and the topographic information base

Issue	Approach	Target	Anticipated outcome
Satellite positioning systems have spawned a revolution in positioning capability resulting in new opportunities and demands for access to a highly accurate spatial reference system. NRCan maintains a modern, nation-wide, infrastructure to support the Canadian Spatial Reference System (CSRS). This system provides the framework of reference for positioning, necessary to secure the economic, environmental and social benefits of integrating spatially-referenced data, which is becoming more prevalent in today's technological society. While all nations require a positioning infrastructure in order to thrive in the information age, Canada's challenge lies in serving an immense and sparsely populated country.	Maintain, improve and ensure access to an increasingly accurate Canadian Spatial Reference System (CSRS) as the globally consistent foundation for spatially related knowledge associated with land and natural resources development and management, natural hazards, the environment, and a growing list of disciplines.	By 2001, meet targets to support an operational, Canada-wide Differential GPS Service (CDGPS) via MSAT satellite – a service to improve GPS-derived positions to a 1–2 metre accuracy. By 2002, develop an improved airborne gravimetry system, in collaboration with academia and industry. By 2002, establish a post-glacial rebound monitoring network. By 2003, establish an improved model of mean sea level (geoid) surface.	*An accessible infrastructure for sustainable development and related leading-edge positioning applications in Canada.*
Geographically referenced information is increasingly crucial to the Canadian economy and to the wellbeing of its people. New tools to aid in the interpretation and application of geographic information are continually being developed to address society's problems and needs. A key element of success in the information age will be our ability to meet the need for current, accurate shareable map data.	NRCan will create a national base of topographic information as a fundamental underpinning to a broad base of geospatial applications in Canada. This new and unique coverage will be built from the royalty free Landsat 7 satellite imagery, allowing for unlimited redistribution of the related products. The images will be acquired by a broad coalition of the main geomatics stakeholders in Canada including provincial and major federal organizations in the field of geomatics. The image will be geometrically corrected using the best ground control available in Canada.	By 2003, produce an up-to-date, accurate and homogenous orthorectified satellite image of the entire country.	*Increased capacity and competitiveness in the emerging information economy.* *A better connected, more enabled Canadian society.*

4.3 Safe use of explosives and pyrotechnics

NRCan is the Government of Canada's primary source of expertise on explosives technology and regulation. As part of the Department's mandated responsibility to administer the *Explosives Act* and Regulations, NRCan authorizes and classifies all explosives used in Canada, regulates the use of display fireworks and pyrotechnics, trains and certifies fireworks supervisors and special effects pyrotechnicians, investigates accidents and incidents, and performs R&D related to explosives and pyrotechnics.

The Department's work on counter-terrorism related to explosives is an important aspect of promoting safer communities in Canada. In this regard, NRCan will increase its contributions to the fight against the use of explosives in criminal and terrorist acts at home and abroad.

Action: Promote safe communities by increasing public security related to explosives

Issue	Approach	Target	Anticipated outcome
There is increased awareness on the part of the international community with regard to terrorism and the use of explosives in terrorist acts. Canada has made a commitment to focus attention on new and emerging threats to Canadians and their neighbours around the world.	Contribute to the development of explosives detection and protection technologies and to the development of regulations to increase controls over explosives used in acts of terrorism. Partners include other government departments, international regulatory agencies, international law enforcement agencies, the US government and private industry.	By 2002, amend the *Explosives Act* to accommodate counter-terrorism initiatives. By 2002, build an Internet-based module called GERM (Global Explosives Regulatory Module) that will facilitate secure communication between international regulators, promoting increased control over items such as detonators which are used by terrorists. By 2003, perform research under the Canada/US Counter-terrorism R&D Program, on technologies to enhance detection of explosives. By 2003, perform studies on the effectiveness of advanced materials in increasing the blast resistance of windows and concrete building elements.	*Improved and more effective regulation of explosives in Canada.* *Increased public security through enhanced detectability of terrorist bombs and enhanced protection of occupants of federal buildings judged to be at risk.*

4.4 Enhance safety and security

In partnership with industry, the provinces and territories, NRCan works to improve the health and safety of all Canadians who work in, or are affected by, the natural resources sector. Health and safety regulation in Canada is the responsibility of the provinces and territories. However, for the most part they do not have the capacity to perform S&T related to mining health and safety. NRCan shares its S&T expertise, transferring its knowledge and technologies to reduce workers' injuries, including death. Application of appropriate technologies in underground mines makes for a healthier, more productive workplace and work force, and supports sustainable communities. For many years, NRCan has been a member of the Canadian Association of Chief Inspectors of Mines and has provided technical assistance and research support on health and safety issues.

Action: Enhance health and safety for mine workers

Issue	Approach	Target	Anticipated outcome
NRCan has been asked to assist in defining basic solutions for risk situations, work cooperatively with supporting parties to develop required technologies, and to provide sound science in support of the provincial/territorial regulations.	Perform S&T to develop knowledge and technologies to reduce potential health and safety hazards for mine workers. Partners include provincial/territorial chief inspectors of mines, mining companies, equipment manufacturers, and academia.	By 2002, develop prototype technology for vibration reduction for portable mining equipment. By 2003, contribute to improved diesel particulate sampling by developing a sampling system as well as a sampling and analysis protocol to meet new exposure guidelines. By 2003, provide improved underground air quality by optimizing ventilation air systems.	*A healthier work force which incurs fewer injuries.*

Goal 5:

To provide Canadians with a department that is efficiently and effectively managed

OBJECTIVES

5.1 Responsible management

5.2 Continuous improvement

5.3 Sustainable development in NRCan operations

NRCan is committed to good governance and the sustainable development of Canada's natural resources. However, today's climate of continual change gives rise to numerous management and organizational challenges in implementing this agenda. These issues need to be identified and properly managed.

Managing the Department efficiently and effectively goes beyond environmental targets. Social responsibility is a key element of sustainable development and, for NRCan, it includes not only our relationship with clients, but also our ability to foster a healthy and productive work environment. The way the Department deals with its employees, its accountability and its own performance must continue to be strengthened.

5.1 Responsible management

NRCan has established a solid reputation for environmental performance and proven track record of technical, scientific and management expertise to help Canada achieve a cleaner environment, maintain a vibrant economy and ensure a lasting legacy for generations to come. NRCan applies that experience and expertise to its own operations.

NRCan, like many leading-edge organizations, has begun to emphasize the need for corporate social responsibility (CSR) and the relationship it has with its employees and external stakeholders. The main elements of CSR are community investment, employee relations, environmental responsibility, human rights and financial sustainability. NRCan sees itself as being no different than any other organization, with a need to achieve our business goals by integrating economic, environmental and sociai-growth opportunities into day-to-day practices.

It has only been over the past decade that traditional non-financial performance measures have been incorporated in the reporting structures of organizations. Some companies have begun to report on social measures in their reporting, as part of their sustainability reports. In both the public and private sector, those organizations that measure and evaluate the results of their work find that it builds support within and outside of the organization.

In *SDS – Now and for the Future* NRCan will work to improve upon our ability to engage stakeholders in developing our programs and policies.

A Conference Board of Canada supplement to *Maclean's* magazine (May 15, 2000) highlighted NRCan's reporting on the implementation of our first sustainable development strategy. The performance measurement indicators that the Department has developed are fundamental tools for stakeholders to assess our progress. Tracking such information is important, as it allows us to demonstrate progress as well as benchmark where we are, which in turn, can fuel continuous improvement through better informed policy decision-making.

Action: Strengthen Departmental capacity to advance sustainable development

Issue	Approach	Target	Anticipated outcome
Sustainable development is central to the mandate of NRCan. NRCan staff require new tools and training to implement this mandate. An enhanced policy capacity will strengthen NRCan's ability to serve Canadians.	NRCan will provide support for career development of staff through development of a sustainable development policy course suited to NRCan.	By 2003 develop a sustainable development policy course for NRCan staff.	*A diverse group of staff able to address policy and develop programs in relation to sustainable development.*
Through Government On-Line, our stakeholders must have access to the information they require and be satisfied with the information they receive.	NRCan will pursue the development and implementation of its quality management approach by identifying and satisfying its customer needs, developing and tapping the full potential of its people and improving its key processes.	By 2003, renew NRCan's Excellence Initiative by focusing on improving quality management practices and client satisfaction.	*Improved employee satisfaction, leading to a more productive and creative workforce who are able to deliver quality services to Canadians.*
Departmental staff have an opportunity to lead by example through day-to-day actions. Transportation use is one example: staff commuting patterns have an impact on energy use, green house gas emissions and local air quality in the community.	Encourage staff to adopt environmentally- and socially-responsible actions both at work and at home.	By 2003, develop a strategy to promote alternative forms of transportation for Departmental staff.	*Create a culture of corporate social responsibility within NRCan, through employees' conscious efforts to address sustainable development issues in their transportation use.*

Issue	Approach	Target	Anticipated outcome
NRCan is committed to corporate social responsibility. Reporting on sustainable development commitments is a key way to demonstrate corporate social responsibility as well as transparency and accountability to the Department's stakeholders.	NRCan will provide access to its Sustainable Development Action Items Management System (SD-AIMS) through the Internet. NRCan will partner with the RCMP and other government departments to promote such transparency through technologies such as SD-AIMS among the federal government.	By 2001, provide NRCan stakeholders with access to SD-AIMS.	NRCan's commitment to sustainable development is enhanced and our credibility with Canadians is strengthened.

Sustainable Development in NRCan Operations

The integration of the principles of sustainable development into NRCan operations is driven by key initiatives and policies as well as the overall legal environmental, health and safety regime of the federal government. As a result of the Leaders' Forum on Sustainable Development held in April 2000, NRCan is co-leading a key initiative on Sustainable Development in Government Operations (SDGO)

SDGO builds on earlier commitments specified in the 1995 *Guide to Green Government*. It outlines seven priority areas that will help departments advance sustainable development. These actions include: procurement, waste management, water conservation, energy efficiency, vehicle fleet management, land use management, and human resources management.

Other key initiatives that are driving the sustainable development of NRCan operations include: the Canadian Environmental Protection Act; the Canadian Environmental Assessment Act; the Toxic Substances Management Policy; Pollution Prevention – A Federal Strategy for Action; the Canada Labour Code – Part II; Climate Change – House in Order Initiative; Greening Government Operations Policy; the Transportation of Dangerous Goods Act; and the Alternative Fuels Act.

5.2 Continuous improvement

The International Standards Organization (ISO) 14000 series of standards provide a comprehensive framework for environmental management within large organizations. The ISO framework describes important characteristics of what is known as an environmental management system (EMS). Central to the successful implementation of an EMS is a process that involves several related components: environmental policy; planning; implementation and operation; measurement and evaluation and management review. Prior to initiating action aimed at continual improvement of EMS performance, a management review is required. However, a management review is difficult or impossible if information is not gathered, through measurement and evaluation, on how the system is performing.

NRCan is committed to measuring key aspects of environmental activities and operations to quantify how we are doing. The results of our measurements will be compared to past performance as well as to our goals and objectives, as expressed in Departmental policies, to determine our overall environmental, health and safety performance and to identify areas that require improvement.

Action: Measure NRCan's internal environmental, health and safety performance

Issue	Approach	Target
Measuring and evaluating activities is fundamental to improving performance. To accomplish this, a system must be put in place that compares measurement results to past performance and to the stated goals and objectives of an organization. These comparisons can then be used to make adjustments to key programs and methods. This approach is consistent with the International Standards Organization (ISO) standards on Environmental Management Systems (14 001 and 14 004).	NRCan will continually improve its environmental, health and safety performance by measuring key characteristics of activities and operations and adjusting programs and methods, as needed, according to the results of these measurements.	By 2002, upgrade central departmental environmental databases. By 2002, develop and implement an environmental measurement system consistent with Sustainable Development in Government Operations (SDGO) and Performance Measurement for Sustainable Government Operations (PMSGO) frameworks. By 2002, report on the implementation progress of the Departmental OSH Policy (2000). By 2002, report on the implementation progress of Departmental Environmental Policy (2000). By 2003, conduct waste water compliance evaluations at key NRCan research facilities. By 2003, conduct environmental, health and safety audits at selected NRCan facilities. By 2003, conduct environmental assessment evaluations within selected NRCan organizational units. By 2003, assess all potentially contaminated sites at NRCan, risk-manage the ones that are identified as contaminated and report related financial liabilities to Treasury Board Secretariat. By 2003, assess the integrity of all NRCan storage tanks and remediate where necessary.

Anticipated outcome

By measuring and evaluating key characteristics of activities and operations and adjusting programs and methods as needed, NRCan will verify that its environmental, health and safety performance is improving over time.

5.3 Sustainable development in NRCan operations

Over the last few years, NRCan has confirmed its capacity to lead by example and demonstrated its progress in improving the environmental performance of its internal operations. The Department has reduced the total amount of solid waste sent to landfill, decreased its energy consumption by implementing strategies to increase efficiency within its own operations, encouraged the responsible handling of hazardous materials and educated employees about environmentally friendly procurement practices.

The use of appropriate tools and approaches to improve environmental compliance and awareness within the organization is critical to NRCan's ability to remain effective and progressive. The Department is continually enhancing awareness tools such as guides, manuals and information sessions. It is also better managing the environmental impacts of real property upkeep and transfers, and strengthening employees' ability to mitigate environmental impacts that may arise from normal operations.

To further cement its leadership in sustainable development, NRCan will enrich and expand programs designed to maximize the environmental performance of Departmental operations. It will develop and implement strategies that improve its own sustainable development performance while advancing government-wide objectives and targets. The Department will provide employees with up-to-date, relevant information to help them understand the environmental implications of their policies and actions and enable them to make better informed decisions as they carry out their day-to-day responsibilities.

Action: Improve environmental, health and safety compliance and awareness at NRCan

Issue	Approach	Target
Responsible environmental, health and safety management within an organization includes legal compliance, progressive measures that go beyond basic compliance, and tools and guidance to inform employees about their environmental, health and safety responsibilities. It is important to recognize that compliance, innovation and awareness are ongoing concerns that must be informed by up-to-date practices and information.	NRCan will improve environmental, health and safety compliance and awareness by adhering to applicable environmental, health and safety laws and regulations, using innovative tools and concepts to go beyond basic legal compliance, and providing up-to-date environmental, health and safety training and information to staff.	By 2001, distribute a guide to reporting and investigating hazardous occurrences in the workplace. By 2002, develop a Departmental directive on the use of chemical pesticides on NRCan land. By 2002, update the NRCan Environmental Assessment Manual. By 2002, update the NRCan Environmental Protection Guide. By 2003, conduct 10 sessions for staff on environmental, health and safety responsibilities (*e.g. C.E.A.A., C.E.P.A., Canada Labour Code, Part II.*).

Anticipated outcome

By meeting or exceeding applicable laws and regulations, and providing up-to-date training and awareness tools to employees, NRCan will demonstrate leadership and innovation in environmental, health and safety responsibility.

Action: Manage hazardous and non-hazardous waste produced by NRCan operations

Issue	Approach	Target
Non-hazardous solid waste is an issue that is becoming more pressing as the amount of waste produced exceeds the absorption capacities of landfill sites. Given this trend, reducing, reusing and recycling materials becomes essential to minimizing impacts on overall environmental quality and integrity. Similarly, hazardous waste may have a serious impact on the environment if not handled in the correct manner. Identification, monitoring, removal and disposal of hazardous waste are key activities for any organization that practices responsible environmental management.	NRCan will manage its hazardous and non-hazardous wastes, in part, by maintaining, expanding and promoting its solid waste diversion program and distributing guidance materials to employees on hazardous waste management issues.	By 2002, produce and distribute guidance materials on hazardous waste management issues to raise awareness among NRCan employees. By 2003, maintain, expand and promote NRCan's waste-free program.

Anticipated outcome

By responsibly managing its hazardous and non-hazardous waste, NRCan will demonstrate that it is taking concrete steps to lessen the impacts of its internal operations on the environment.

Action: Develop and implement strategies to increase the efficiency of energy and resource use in NRCan operations

Issue	Approach	Target
Using resources efficiently is fundamental to any serious attempt to reduce environmental impacts. The relationships among energy sources, materials and emissions are complex and often interchangeable. However, from a practical perspective, programs and activities that seek to reduce consumption of fossil fuels, electricity and water have the greatest potential to reduce the demand on primary resources.	NRCan will conserve energy and resources by participating in an interdepartmental process to reduce greenhouse gas emissions from internal operations, by managing the vehicle fleet more efficiently, by implementing a space efficiency policy and by implementing a water conservation strategy.	By 2001, provide input to the interdepartmental Climate Change / House in Order process for greenhouse gas (GHG) reduction target-sharing. By 2001, develop and implement a three-year action plan to progress towards 2010 target GHG levels. By 2001, develop and implement a revised Fleet Management Policy. By 2002, develop and implement a water conservation strategy for NRCan. By 2003, prepare and implement a space standards policy for using space more efficiently at NRCan.

Anticipated outcome

By undertaking projects to increase the efficiency of internal operations, NRCan will advance government-wide efforts to reduce consumption of primary resources and production of undesirable emissions, such as greenhouse gases.

Action: Develop a strategy to promote the use of eco-efficient goods and services within NRCan

Issue	Approach	Target
Use of eco-efficient goods and services, green procurement and environmentally friendly procurement all refer to the same thing: the practice of purchasing goods and services that have been identified as less damaging to the environment than standard goods and services. The objectives of green procurement include reduction of resource consumption, greenhouse gas emissions, environmental, health and financial risks, and costs.	NRCan will promote the use of eco-efficient goods and services by developing a Departmental strategy that is consistent with Canadian federal government approaches.	By 2003, prepare a strategy to outline how NRCan will promote the use of eco-efficient goods and services within its own operations.

Anticipated outcome

By participating in government-wide efforts to implement mechanisms for eco-efficient procurement and by developing its own strategy consistent with overall government progress, NRCan will reduce environmental impacts resulting from its own operations by purchasing goods and services that are environmentally friendly.

Measuring

the vision

On the first two pages of this document, readers were supplied with NRCan's vision of a sustainable future. We believe the actions identified within this document represent concrete steps to move Canada along the path towards this future. In this context, to advance sustainable development, Canadians and the international community need reliable and up-to-date information on the state of sustainable development.

Sustainable development requires making informed policy choices based upon the integration of economic, environmental and social considerations into the decision making process. Indicators of sustainable development would communicate the results of implementing decisions and provide the foundation for continuous improvement in advancing sustainable development.

Developing adequate measurement tools with regard to the natural resources sector will help to ensure that NRCan and Canada are able to report to stakeholders on sustainable development. Without having a concrete set of indicators, it will continue to be difficult to monitor Canada's progress and to focus activities toward sustainable development.

Under the federal Policy Research Initiative Sustainability Project, NRCan and Statistics Canada are co-leading a project on sustainable development indicators, with the participation of ten other federal departments. This project has been set up to review and analyze the many national and international approaches to developing interlinked indicators for sustainable development. The project explores the potential applicability of selected activities and sets of indicators relevant to policy making in Canada. This project is contributing to the development of a set of national indicators of sustainable development, being developed by the National Round Table on the Environment and Economy, which the federal government committed itself to in the February 2000 Budget. It feeds into the *Knowledge and Information/Sustainable Development Indicators* theme that has been adopted by federal departments and agencies as a result of the Leaders' Forum of federal Deputy Ministers and leaders from industry and civil society, in April 2000.

For NRCan to continue to lead on sustainable development there is a need to demonstrate the capacity to provide the economic, social and scientific information to inform decision making regarding our natural resources. Currently the Department collects and provides information on economic, social and environmental indicators in a number of venues, and is in the process of developing sustainable development indicators within our various sectors. Providing Canadians with access to this information is a necessary step and it may prove the need to refine these indicators further.

In November 1999, NGOs, Aboriginal communities, academia, industry and government came together to build a framework for indicators of sustainable development for minerals and metals. A fair and open process contributed to a spirit of cooperation, resulting in a consensus on a common vision statement for minerals and metals production and use in Canada. Upon the conclusion of a consultation period, the steering committee with the aid of

a reconfigured multi stakeholder working group will develop a draft set of sustainable development indicators for minerals and metals.

Over the past year, NRCan has undertaken an extensive internal exercise to develop a national set of indicators for energy. Indicators have been developed that address the three components of sustainable development, with a focus on establishing indicators where there is overlap between the economic, social and environmental elements of sustainable development. External consultations over the fall of 2000 have confirmed the approach that has been taken.

An extensive user requirements study for the sustainable development policy community, conducted by the National Atlas of Canada, has suggested a series of requirements in order to make efficient use of geospatial information in support of the sustainable development policy process. The Atlas role in sustainable development rests upon how it presents comprehensive, consistent, integrative and authoritative national scale view of the physical, economic, environmental, social and cultural makeup of Canada.

In 1995 the Canadian Council of Forest Ministers' developed a framework of criteria and indicators for sustainable forest management. In 1997, Canada followed up on this framework by publishing *Criteria and Indicators of Sustainable Forest Management*, a document that described Canada's ability to report on sustainability. At their August 14, 2000 annual meeting, the Canadian Council of Forest Ministers (CCFM) released its "Criteria and Indicators of Sustainable Forest Management: National Status 2000" report, which illustrates Canada's continued commitment and scientific approach toward the sustainable management of its forests.

On an international level, providing such information, provides a window which allows Canada to report on the sustainable development of our natural resources to organizations such as the OECD. Our work in Criteria and Indicators, in Canada, and as Liaison Office for, and member of the Montréal Criteria and Indicators Process which involves twelve major temperate and boreal forest countries, can allow us to position Canada as a world leader in this area and increase our influence in promoting our international agenda. Furthermore, indicators can allow Canada and our domestic industries to demonstrate to the international community the good practices Canada has adopted.

By the end of 2003, Natural Resources Canada, through its indicator development and reporting, will be in a position to begin measuring progress against *NRCan's Vision for a Sustainable Future*.

Appendix A

Measuring our Progress – NRCan's Performance Measurement Framework

NRCan has developed a Performance Measurement Framework (PMF) that articulates a clear set of goals, objectives and performance indicators. The performance indicators, which appeared in draft form in the 1997 *Sustainable Development Strategy – Safeguarding our Assets, Securing our Future*, have been further refined in consultation with our stakeholders. These indicators will help Canadians assess NRCan's progress in achieving its goals and objectives in the context of sustainable development and good governance and will provide the foundation for all departmental planning and reporting documents. In this regard, the framework addresses reporting and performance requirements of the department's Sustainable Development Strategy, the Federal S&T Strategy, and internal management practices.

Accountability at Three Levels

NRCan's work in promoting sustainable development can be assessed by stakeholders at three different levels.

At the most basic level, through regular reporting on action commitments, stakeholders will have a clear indication of whether the Department is meeting its commitments.

At the second level, through indicators and targets, NRCan's performance can be measured against the Strategy's objectives.

Finally, at a broader level, Canada's overall progress in the sustainable development of its natural resources can be assessed through indicators dealing with sustainable development practices in the areas of forest management, energy, and minerals and metals.

NRCan showcased its distinct approach to reporting on performance indicators in the Departmental Performance Report (DPR), which was tabled in Parliament in October 1999. Each indicator – one for each of the Department's five goals – reported on four elements (i.e., graphic representation, interpretation of graph, description of NRCan's contribution and next steps) to communicate NRCan's story. The information included a mix of numerical targets, directional targets (i.e., to maintain or improve on existing performance), and trend analysis and monitoring (i.e., when it is too difficult to attribute the Department's contribution to a 'macro' indicator, even though the indicator is of high importance to NRCan).

Building on the initial report of indicators, NRCan has prepared a schedule for reporting over the next three years. The following table presents NRCan's Performance Measurement Framework and also identifies a reporting date for each performance indicator – for publication and tabling in Parliament of NRCan's Departmental Performance Report. The schedule for reporting will inform Canadians of the time frame for assessing the department's progress in achieving its goals and objectives through the use of specific indicators.

Goal 1:
To provide Canadians with information to make balanced decisions regarding natural resources.

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE*
1.1 Easily accessible and integrated knowledge on the state of Canada's landmass and natural resources, and the economic, environmental, and social dimensions of their use.	1.1.1 User satisfaction with relevance, accessibility and quality of information.	Maintain or improve current levels of use and satisfaction.	2001
	1.1.2 Public awareness of the importance and relevance of the natural resource sectors, its issues, and NRCan's S&T.	Maintain or improve awareness.	2001
	1.1.3 Adoption of NRCan-supported technology and practices.	Not applicable.	2002
1.2 Greater national and international cooperation and consensus on sustainable development issues, policies, goals and actions.	1.2.1 Participation in, and influence on, national and international multi-stakeholder approaches to SD issues.	Maintain or improve participation and influence.	2001
	1.2.2 Degree of leveraging by NRCan from shared S&T projects.	Maintain or improve total funds and in-kind support leveraged.	2001
1.3 Fiscal, regulatory and voluntary approaches that encourage the sustainable development of natural resources.	1.3.1 Participation in, and influence on, fiscal, regulatory and voluntary sustainable development initiatives.	Maintain or improve participation and influence.	2002
	1.3.2 Influence of NRCan's S&T-based recommendations on regulatory regimes.	Not applicable.	2003

Goal 2:
To provide Canadians with sustainable economic, social and environmental benefits derived from natural resources for present and future generations.

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
2.1 Greater economic opportunities and encouraging investment in innovative and higher-value uses of natural resources.	2.1.1 Economic influence of NRCan S&T.	Trend analysis and monitoring.	2002
	2.1.2 Employment levels and productivity in resource and resource-related industries.	Trend analysis and monitoring.	2001
	2.1.3 Contribution of the natural resource sector to the GDP.	Trend analysis and monitoring.	2001
	2.1.4 Capital investment in resource and resource-related industries.	Trend analysis and monitoring.	2002

* Tabling date indicates the year that the indicator will be reported in the Departmental Performance Report to Parliament.

Goal 2 continued ...

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
2.2 Expanded access to international markets for Canadian resource-based products, knowledge, technologies and services.	2.2.1 Value and percent of exports of resource-based products.	Trend analysis and monitoring.	2003
2.3 Increased capacity of communities to generate sustainable economic activity based on natural resources.	2.3.1 Number of shared projects and funds leveraged with rural, Aboriginal and northern communities.	Trend analysis and monitoring.	2001
	2.3.2 Employment level of Aboriginal peoples and northern residents in resource sectors.	Trend analysis and monitoring.	2003

Goal 3:
To provide Canadians with strategies that reduce environmental impacts in the natural resources sector.

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
3.1 Canada addressing its international Kyoto commitment to reduce greenhouse gases.	3.1.1 a) GHG emissions compared to Kyoto protocol b) GHG emissions to GDP ratio compared to other countries.	Canada's Kyoto protocol target is to reduce GHG emissions to 6% below the 1990 level between the years 2008 and 2012.	2001
	3.1.2 Trends in use of renewable energy.	Trend analysis and monitoring.	2002
	3.1.3 Trends in energy efficiency.	After the energy efficiency index has been developed a desired directional target will be stated and a quantitative target will be considered.	2001

Goal 3 continued ...

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
	3.1.4 GHG emissions from federal operations.	By the year 2005, reduce GHG emissions from federal operations by 20% below 1990 levels.	2003
	3.1.5 Progress towards the identification of impacts and adaptation measures.	To be determined.	2001
3.2 Science, technology and stewardship practices that reduce environmental impacts, conserve biodiversity, and increase the efficiency of resource development and use.	3.2.1 Environmental influence of NRCan's science, technology and stewardship practices.	Maintain or improve NRCan`s influence.	2001
3.3 Canada's environment safeguarded from the risks associated with natural resource development and use.	3.3.1 Progress towards addressing hazards associated with resource development and use.	Maintain or improve safeguards – hazard specific.	2002

Goal 4:
To provide Canadians with safety and security in the natural resources sector.

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
4.1 Canadians safeguarded from natural hazards.	4.1.1 Impact of NRCan`s S&T on the identification, mitigation and response to natural hazards.	Hazard specific.	2001
4.2 A national framework for spatial positioning, mapping and boundary maintenance.	4.2.1 User satisfaction with aeronautical charts, the Canada Lands Survey System and the Canadian Spatial Reference System.	Service standards exist in all 3 areas. Meet cycle deadlines 100% of the time. Maintain standards.	2001
4.3 Safe use of explosives and pyrotechnics.	4.3.1 Accident and incident rate in the explosives and pyrotechnic industries in Canada.	Zero accidents, no incidents.	2002
4.4 Enhanced safety and security in Canada's natural resource sector.	4.4.1 Impact of regulatory frameworks for energy transmission, offshore development, and Canada's uranium and nuclear industry.	Improvements to regulations and guidelines.	2003

Goal 5:
To provide Canadians with a department that is efficiently and effectively managed.

OBJECTIVES *As demonstrated by:*	PERFORMANCE INDICATORS	TARGETS AND APPROACHES	TABLING DATE
5.1 Managing NRCan's resources responsibly.	5.1.1 Employee satisfaction with NRCan management practices.	Trend monitoring and analysis with corrective action as necessary.	2001
	5.1.2 Progress towards maintaining and enhancing NRCan's Program Integrity.	To be determined.	2001
	5.1.3 Savings realized from streamlining administrative processes, innovative service delivery, electronic commerce, improved facilities management, and information technology bulk purchasing and contracts.	To be determined on a project-by-project basis.	2003
5.2 Continuously improving NRCan products, services, and operations.	5.2.1 Implementation of recommendations from audits, evaluations, and other studies of NRCan management and operations.	To be determined.	2001
	5.2.2 Progress towards the implementation of leading-edge management practices.	Sector specific.	2003
5.3 Sustainable development in NRCan operations	5.3.1 Progress of the department`s Environmental Management System (EMS) towards the implementation of ISO 14000 series of standards.	By 2000, NRCan will be compatible with the ISO 14000 series of standards.	2003
	5.3.2 Progress towards the implementation of environmental health and safety audits and environmental assessment evaluation of NRCan operations.	100% implementation with action items stemming from findings of audit and evaluations.	2001
	5.3.3 Amount of solid non-hazardous waste from NRCan operations per capita per year.	By 2000, 50% reduction in solid non-hazardous waste from level measured in 1995-96 audits.	2002
	5.3.4 Portion of fleet converted to alternative fuels.	By 2004, 75% of fleet converted to alternative fuels where technically and operationally feasible.	2002
	5.3.5 Rate of purchasing by NRCan of green power.	10,000 MWH of power purchased per annum.	2001

Appendix B

Operating Principles for Sustainable Development

The following principles will guide the Department's work throughout *Sustainable Development Strategy – Now and for the Future:*

Accountability and Transparency – Within our defined role, we will develop results-based action plans outlining what we propose to do and when it will be done, and provide indicators to measure progress toward sustainable development. We will monitor the outcomes of our activities, taking corrective action where necessary, and publicly report on our progress. We will ensure open decision-making processes.

Consultation and Partnerships – We will pursue federal responsibilities that contribute to sustainable development in partnership with a diverse array of stakeholders. We will consult with our partners to understand their needs and to build consensus on common objectives and actions.

Integrated decision-making – We will make decisions based on sound economic, environmental and social principles, relying on tools such as environmental assessment and scientific assessments of risk. We will improve our ability to analyze decisions for their life-cycle environmental impacts, their full costs and benefits, and their implications for society.

Science and knowledge – We will promote the use and availability of scientific data, traditional knowledge and sound analytical processes to assess and manage risks to environmental and human health, society and the economy.

Precaution – Where there are threats of serious or irreversible damage, lack of full scientific certainty will not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Anticipation and prevention – Preventing problems before they arise is more effective than responding to them after they occur. We will promote pollution prevention, as opposed to clean-up, to avoid or minimize the creation of waste and pollution and to make more efficient use of resources.

Ecosystem integrity – We recognize that resource development must remain within the capacity of natural ecosystems to respond, adapt and recover from human disturbance while maintaining the basic ecological functions that support life.

Efficient use of resources – We will promote policies, practices and technologies that reduce consumption and make the most efficient use of natural resources in order to support a sound economy, while minimizing wastes and adverse impacts on the environment.

Continuous improvement and innovation – Our commitment to sustainable development will be based on an openness to new approaches and will continually be updated and adapted to reflect new knowledge, technology, information and ideas.

Intergenerational equity – We will uphold our responsibility to provide a legacy for future generations in terms of their natural heritage, economic opportunities and social well-being.

Shared responsibility – Sustainable development is the responsibility of the entire Government of Canada and of all Canadians.

Setting an example – We will promote sustainable development through our actions as well as through laws, policies and programs.

Appendix C

Preparations for Sustainable Development Strategy – Now and for the Future

Preparations for Natural Resources Canada's second Sustainable Development Strategy began immediately after tabling the first. During the three year period since the initial strategy was launched, NRCan has:

- revisited and evaluated departmental goals and objectives;
- established time-bound, measurable targets;
- identified natural resource reliant communities, in order to establish a dialogue with representatives from these communities;
- consulted with stakeholders on a performance measurement framework;
- strengthened the Department's management system;
- reported to stakeholders and Parliamentarians on progress;
- conducted an internal review of the department's first SDS;
- evaluated changing circumstances that have influenced the development of the second SDS.

Central to these preparations has been an ongoing process of citizen engagement. Indeed, over the three-year period, a broad range of participants throughout the country have been involved in the process of implementing and developing the Sustainable Development Strategy, providing NRCan with valuable advice and information from each sector of society.

Review of Goals, Objectives and Targets

Early in 1998, senior management saw a gap in the performance measurement framework introduced in the first SDS. The Department's efforts to contribute to the safety and security of Canadians were not adequately integrated into the goals structure. In response to this gap, a new goal and associated objectives were developed in order to capture this important social dimension of sustainable development. As well, the Department's performance measurement framework was amended to include these changes. In addition, draft performance indicators were developed to respond to the new goals and objectives while draft indicators for the existing goals and objectives were revisited. Following these revisions, the Department consulted with stakeholders on the performance measurement framework, to arrive at a meaningful set of indicators that would effectively communicate progress and results.

The Report of the Commissioner of Environment and Sustainable Development, in May 1998, recommended that departments establish clear targets to measure progress towards sustainable development. NRCan addressed this recommendation by establishing 125 time-bound, measurable targets for the 68 action commitments within the first SDS. In addition, targets responding to the performance measurement indicators were established.

Further to this recommendation, NRCan developed a Sustainable Development Action Items Management System (SD-AIMS) in 1999. This system is a Web-based tracking and reporting tool that has enabled the Department to expedite reporting of progress and performance on Sustainable Development Strategy action commitments to senior management, staff and stakeholders.

A Continuing Dialogue with Stakeholders

In January 2000, a report entitled *Sustainable Development: From Commitment to Action* was distributed from the Minister of Natural Resources to the Department's stakeholders, including industry, academic institutions, communities, environmental groups, other governments, aboriginal associations, Members of Parliament and Senators. A message from NRCan's Deputy Minister was sent to all NRCan employees to notify them of the document on the Department's Web site.

This progress report was accompanied by a short questionnaire, *Issues and Expectations*. It intended to gain feedback on progress made to date on the first SDS, to understand the key issues and concerns of Canadians regarding the sustainable development of natural resources, and to gauge expectations for the Department's second SDS. The progress report and questionnaire were also made available on the sustainable development page of NRCan's Web site (*http://www.nrcan.gc.ca/dmo/susdev*).

We received a total of 105 responses to the questionnaire, by e-mail, fax and mail. Although over 80 percent of responses indicated that NRCan is meeting or exceeding expectations with respect to progress, a number of suggestions were made on ways to improve. The most common suggestion was the need for more detailed reporting of progress.

Also in January 2000, a presentation was made to NRCan's management committee on the progress made toward implementing the first SDS and the path forward for developing *SDS – Now and for the Future*. The committee provided direction on areas of focus for the new strategy, including the need for an expanded focus on the social dimension of sustainable development.

An independent Advisory Panel composed of thirteen representative stakeholders was then assembled in the spring to review the results of *Issues and Expectations* and to provide guidance for preparing *SDS – Now and for the Future*. This advisory panel identified specific areas where NRCan leadership is important, a number of domestic and international changes that have influenced the issues and approaches that NRCan should consider, themes to address in *SDS – Now and for the Future*, and desired outcomes for 2003. The approach to *SDS – Now and for the Future* was then presented to key stakeholder groups, including the Minister's Advisory Council on Science and Technology and the Environment Committee of the Canadian Council for International Business, and other federal departments. This approach described the outline for the discussion paper, identifying the key areas for action that we would take as well as our plan to distribute the document and to meet with stakeholders, and then to develop the final document for tabling in Parliament.

Review of the 1997 Sustainable Development Strategy

In the spring of 2000, NRCan's Audit and Evaluation Branch conducted a review of the implementation status of the Department's first SDS. The review concluded that NRCan has achieved much of what was committed to in the first SDS, and that the Department was well positioned to develop its successor.

However, the review identified five areas that would further enhance NRCan's ability to respond to its sustainable development goals:

- NRCan would benefit from complete reporting of progress made against all of its SDS commitments, by providing explanations in cases where commitments have not been fully completed at the time of reporting, in addition to reporting on targets that have been met. The process for completing status or progress reports should also include clarification of the criteria used to determine whether commitments have been completed.
- NRCan should ensure that there is a framework in place to document the progress made against commitments, using consistent measurement criteria and documentation standards throughout the Department.
- NRCan should ensure that officers responsible for implementation are identified for future SDS commitments, and that the SDS-related accountabilities are clear and accepted by these individuals. This includes ensuring that such accountabilities are transferred to other individuals subsequent to staff changes and that the accountabilities are clearly documented.
- In developing the second SDS, NRCan should ensure it integrates the lessons learned from this exercise. This exercise would help managers draw from experiences of the first SDS. In turn, this knowledge could help ensure an appropriate balance between achievability of commitments and the need to "push the envelope" in terms of the Department's response to the goal of sustainable development.
- NRCan's electronic system for reporting on SDS commitments, SD-AIMS, should ensure that the system responds to users' requirements.

As continuous improvement is key to advancing sustainable development, these suggestions will strengthen NRCan's ability to implement the SDS. The recommendation to report on all commitments of the SDS in status or progress reports will be addressed through an upgrade to the department's Sustainable Development Action Items Management System (SD-AIMS).

We recognize the need to ensure consistent measurement standards and documentation, across all sectors, on the status of work against each commitment. We also recognize that individual sector coordinators and accountabilities could be more clearly documented. This will be addressed in the enhancement to SD-AIMS, and in the implementation of *SDS – Now and for the Future*.

Gearing up for *SDS – Now and for the Future* – Discussion Paper and Consultations

In the Spring of 2000, NRCan took the preliminary input from *Issues and Expectations* and the Advisory Panel to develop a discussion paper that would be used to conduct further consultations with stakeholders. The Department's sustainable development team reviewed the action commitments from the first SDS with a view to building on existing commitments. In this regard, actions were analyzed to assess strategic opportunities for *SDS – Now and for the Future*.

The Path Forward to SDS 2000 – A Discussion Paper was distributed from the Minister to NRCan stakeholders in August, 2000. The discussion paper proposed areas *where* NRCan could best make a difference, and laid out proposed actions that described *how* NRCan would make a difference. This enabled us to engage in a more complete discussion with our stakeholders – to determine what had really changed over the first three years, to propose actions that would address the most important sustainable development issues, and to evaluate these proposed actions with our stakeholders.

The discussion paper was accompanied by a short questionnaire, *Actions and Expectations*, intended to gather input from stakeholders on the actions that NRCan proposes to undertake for *SDS – Now and for the Future*. A message from NRCan's Deputy Minister was sent to all NRCan employees to encourage them to read the document and to participate in the development of the new SDS. A second Advisory Panel was held to review *The Path Forward* in advance of distribution.

In summer/fall 2000, consultations with external stakeholders were held in Calgary, Halifax and Ottawa to obtain input on *The Path Forward* and proposed actions. Individuals representing academic institutions, private companies, industry associations, non-government organizations, aboriginal groups, municipalities, and provincial and federal departments attended the three sessions. Consultations were also held with NRCan staff in Edmonton, Dartmouth and Ottawa. NRCan's sustainable development team met with other federal departments to identify proposed actions that may be undertaken jointly. As part of the consultation sessions, NRCan distributed the results of a review undertaken by the Department's Audit and Evaluation Branch of the first Sustainable Development Strategy. The results of the consultations were published in a summary document entitled *What You Said 2000* and distributed to participants. The Advisory Panel reviewed the final draft *SDS – Now and for the Future* in January 2001 to provide input prior to the document being tabled in Parliament.

Northern Sustainable Development Strategy

NRCan has been an active participant in the development of a federal Northern Sustainable Development Strategy (NSDS), led by the Department of Indian Affairs and Northern Development. Representatives of Environment Canada, NRCan, INAC, Department of Foreign Affairs and International Trade, Department of Fisheries and Oceans, and Health Canada met with northerners in Whitehorse, Yellowknife and Iqaluit. These consultations gave these departments an opportunity to present their departmental sustainable development strategies, and to seek guidance on how to develop the NSDS.

Appendix D

Departmental Mandate and Organization

Natural Resources Canada is an economic, science-based department with a mandate to promote the sustainable development and responsible use of Canada's mineral, energy, and forestry resources; to develop an understanding of Canada's landmass; and to collect and disseminate knowledge on sustainable resource development. The Department conducts research and technical surveys to assess Canada's resources, including the geological structure and legal boundaries. NRCan is also authorized to provide the national framework of reference for spatial positioning; prepare and publish maps; conduct scientific and economic research related to the energy, forestry, mining and metallurgical industries; and to establish and operate scientific laboratories for these purposes.

Departmental Mandate

NRCan is responsible for federal resource policies and science and technology that support the sustainable development and competitiveness of the energy, forest, mining, and related sectors. The Department enables the Government of Canada to address resource issues in a comprehensive manner, from a national perspective.

By legislation, the Minister of Natural Resources is responsible for:

- Coordinating, promoting, recommending and implementing policies, programs and practices pertaining to the mandate of NRCan;
- Fostering the integrated management and sustainable development of Canada's natural resources;
- Helping in the development and promotion of Canadian scientific and technological capabilities;
- Gathering, compiling, analyzing, coordinating and disseminating information respecting scientific, technological, economic, industrial, managerial, marketing, and related activities and developments affecting Canada's natural resources;
- Participating in the development and application of codes and standards for spatial positioning and natural resource products, and for the management and use of natural resources;
- Improving remote-sensing technology and promoting the development of the Canadian remote-sensing industry;
- Encouraging the responsible development and use of Canada's natural resources, and the competitiveness of Canada's natural resource products;
- Working to widen and promote markets for Canada's natural resource products and geomatics industries, both at home and abroad; and,
- Working in partnership with provincial/territorial governments and non-governmental organizations in Canada, and promoting cooperation among nations and international organizations.

Other Agencies

NRCan maintains a special relationship with agencies which report to Parliament through the Minister of Natural Resources. These agencies include the National Energy Board, the Canadian Nuclear Safety Commission (formerly Atomic Energy Control Board), Atomic Energy of Canada Limited, the Energy Supplies Allocation Board and the Cape Breton Development Corporation. These Agencies are not included in the Sustainable Development Strategy of the Department.

Organization

NRCan is organized into five sectors and three branches. The Strategic Planning and Coordination Branch is NRCan's centre for strategic policy leadership, expertise and advice for Departmental and portfolio priorities, horizontal policy/science issues and initiatives, and sustainable development in Canada and internationally. It leads the development and implementation of the Sustainable Development Strategy.

The Earth Sciences Sector is the Government of Canada's principal agency for earth science knowledge and information. Geomatics Canada provides a reliable system of surveys, remotely-sensed data as well as geographically referenced information describing the Canadian landmass; the Geological Survey of Canada is a principal contributor to a comprehensive geoscience knowledge base of Canada; and, the Polar Continental Shelf project contributes to scientific research in our Arctic regions by providing comprehensive logistics support.

The Canadian Forest Service promotes the sustainable development of Canada's forests and the competitiveness of the Canadian forest sector for the well-being of present and future generations of Canadians. It delivers its science and technology program through five national science research networks operating out of five regional research centres and headquarters.

The Minerals and Metals Sector promotes the sustainable development of Canada's minerals and metals resources industry by integrating economic, social and environmental objectives. It provides policy advice, S&T, as well as commodity and statistical information in support of decision making. It is also the federal government's primary source of expertise on explosives regulations and technology.

The Energy Sector promotes the sustainable development and safe and efficient use of Canada's energy resources through its policies, programs, and science and technology. It assesses the potential economic, regional, international and environmental implications of Canada's energy production and use. It also provides technical knowledge and advice to the energy industry and to government. Its knowledge base helps the Government of Canada to formulate policies, implement regulations, enhance job and wealth creation, and meet its international commitments.

The Corporate Services Sector provides functional direction to the Department in the effective and efficient management of resources in the areas of finance, administration, human resources, information management/-information technology and environmental affairs.

In addition, the Communications and Audit and Evaluation Branches, contribute to improved accountability as well as an increased understanding of NRCan's mandate and programs among Canadians, clients and employees.